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# Nicaragua Ex-Post Impact Evaluation of the Emergency Social Investment Fund (FISE)

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**ACRONYMS AND ABBREVIATIONS**

CIDA	Canadian International Development Agency
COSUDE	Swiss Agency for Development and Cooperation
FISE	Emergency Social Investment Fund (Fondo de Inversión Social de Emergencia)
GON	Government of Nicaragua
HDN	Human Development Network – World Bank
HIPC	Highly Indebted Poor Countries Initiative
IDB	Inter-American Development Bank
IDEAS	Institute of Business Development Associates (Instituto de Desarrollo Empresarial Asociativo)
INAA	Nicaraguan Water and Sanitation Institute (Instituto Nicaraguense de Acueductos y Alcantarillado)
INEC	National Institute for Statistics and Census (Instituto Nacional de Estadísticas y Censos)
KfW	German Bank for Reconstruction (Kreditaustalt für Weideraufbau)
LSMS	Living Standards Measurement Survey
MED	Ministry of Education (Ministerio de Educación)
MINSA	Ministry of Health (Ministerio de Salud)
NGO	Non-Governmental Organization
PMF	Preventative Maintenance Fund - FISE
PREM	Poverty Reduction and Economic Management Unit – World Bank
SIDA	Swedish International Development Authority
UNDP	United Nations Development Programme
USAID	United States Agency for International Development

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**NICARAGUA**  
**EX-POST IMPACT EVALUATION OF THE EMERGENCY SOCIAL**  
**INVESTMENT FUND (FISE)**

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## BACKGROUND PAPERS

The following background papers were prepared as inputs to this report. These are available from the individual authors or from Laura B. Rawlings at the World Bank. The contributions from the authors is gratefully acknowledged:

- Bermudez, Gustavo, Lilia Maria Castro Monge, and Luz Marina Gracias Fonseca. 2000. "An Institutional Analysis of FISE", Processed, GB Associates, Managua, Nicaragua.
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# **NICARAGUA**

## **EX-POST IMPACT EVALUATION OF THE EMERGENCY SOCIAL INVESTMENT FUND (FISE)**

### **EXECUTIVE SUMMARY**

This report presents the results of the first impact evaluation carried out of the Nicaragua Emergency Social Investment Fund (FISE). Using robust impact evaluations methodologies this evaluation provides empirical evidence regarding FISE's success in reaching poor households and contributing to their human capital formation. The evaluation also provides insights into communities' interactions with FISE and the quality of publicly-provided social services that have received a FISE investment.

The FISE Ex-Post Impact Evaluation is one of the first to be carried out on a social fund since the introduction of these mechanisms a decade ago. Together with the impact evaluations of the Bolivian and Honduran social funds, these impact evaluations have served as a model for the development of other social fund evaluations worldwide through their inclusion in the World Bank's research project "Social Funds 2000" that explores the household impact, targeting, sustainability and cost-effectiveness of selected social funds worldwide.

FISE is a dynamic public sector institution established in 1990 to mitigate the unemployment effects of the economic stabilization program. Like many other social funds, FISE's mandate has grown beyond that of providing a safety net to playing a key role in improving living conditions and development opportunities among the poorest segments of Nicaragua's population. It seeks to accomplish this goal by improving the quality and sustainability of priority social infrastructure in poor areas - particularly schools and health posts - in accordance with community demands. Recently, FISE has expanded its range of activities to include promoting national decentralization efforts and providing conditional cash transfers to households in extreme poverty through the 'Red de Protección Social', now in its pilot phase.

#### **THE FISE EX-POST IMPACT EVALUATION**

This evaluation addresses several crucial questions concerning the effectiveness of social funds that have fueled debate for close to a decade:

- Do social funds reach poor communities and households?
- Are social fund investments carried out in response to community priorities? Do social fund projects involve communities in the design, implementation and maintenance of the projects?
- Are the schools, health posts and other social fund infrastructure investments used by the communities? Do the line ministries or others provide needed staff and supplies or are the infrastructure projects completed, but underutilized because of non-infrastructure deficiencies?
- What is the final impact of social fund investments on beneficiaries' health and education status?

To answer these questions, the FISE Ex-Post Impact Evaluation was carried out in 1998-1999 and reviews the impact of FISE primary education, rural health post, latrine, water and sewerage projects executed from January 1994 to June 1997 with respect to:

- Targeting the poorest municipalities, communities, and households
- Community priorities and participation
- Projects' utilization rates, and operational and physical sustainability
- Impact on beneficiaries' health and education status

The objectives of the evaluation are: (i) to determine the progress attained to date in achieving FISE's goal of improving the impact, sustainability and quality of social services provided to the poor; (ii) to evaluate FISE's contributions to the achievements observed; and (iii) to formulate policy recommendations for FISE, line ministries and others in order to accelerate future progress towards poverty reduction in Nicaragua.

**Rationale for the Ex-Post Impact Evaluation.** Between 1991-1998, FISE investments constituted 40 percent of total public investments in social sector infrastructure and approximately one percent of Nicaragua's GDP, making it one of the most important social sector institutions in Nicaragua and one of the largest social funds in the world as measured by the share of national resources absorbed by its activities. Given FISE's central role in social infrastructure development and recognized success in resource mobilization, the Government of Nicaragua along with the World Bank and other donors decided to assess the impact of the organization's operations on its primary goals of supporting physical and human capital investments among the poorest in Nicaragua.

**Collaborative Process.** The FISE Ex-Post Impact Evaluation was jointly designed by the World Bank and FISE's Planning Department and carried out in collaboration with Nicaragua's National Institute for Statistics and Census (INEC). The entire effort was led by a World Bank-FISE-INEC evaluation team, a joint collaboration entailing continuous cooperation and dialogue that built evaluation capacity within the Government of Nicaragua and ensured policy relevance to the evaluation results.

The FISE Evaluation team is presently conducting a cost-effectiveness analysis of FISE subprojects as well as using the results of the 1998 LSMS to update the FISE Poverty Map, the principal targeting mechanism used by FISE and other institutions to distribute resources according to poverty levels. These results will be presented separately.

**Data Sources.** The evaluation makes use of three principal data sources:

- **The LSMS and FISE Household Surveys.** The FISE Evaluation took advantage of the 1998 national Living Standards Measurement Survey (LSMS) household survey designed to assess poverty in Nicaragua to oversample households in areas served by FISE and comparison group projects. The combined use of the LSMS and FISE household surveys provided a basis for both the poverty targeting and household impact estimates carried out for the FISE Evaluation and provides a *methodological model for future evaluations*. The household survey was designed collaboratively by the LSMS and FISE evaluation teams and captures basic household-level socioeconomic information including a consumption-based poverty measure, an assessment of malnutrition using an anthropometric module, and measures of household members' access to basic social services. Overall, 4,040 households were included in the LSMS household survey and 1,312 households in the FISE household survey.
- **The FISE Facilities Survey.** Designed by the FISE evaluation team, the FISE Facilities Survey was applied to determine the status of a random sample of FISE-supported school, health post, and water and sanitation facilities, as compared to similar non-FISE facilities in neighboring communities. The survey collected data regarding facilities' levels of utilization over time, operational sustainability as

provided by inputs such as the staff and medicines required by health posts, physical sustainability based on the condition and maintenance of the infrastructure, and community participation. Overall, 131 facility questionnaires were completed.

- **The Qualitative Beneficiary Assessment** applied focus groups and key informant surveys to evaluate community satisfaction with FISE projects and the community role in project development and maintenance. In 1998, this annual evaluation was applied (with funding from KfW and the Inter-American Development Bank) by the Instituto de Desarrollo Empresarial Asociativo (IDEAS) to 22 municipalities that had benefited from FISE investments, and investigated a total of 43 FISE projects completed in the period 1991 to 1996 in those communities. These communities were selected as a sub-sample from the random sample of FISE projects and corresponding communities selected for the Ex-Post Evaluation to provide robustness to the study.

The use of these instruments allows for an integrated evaluation based on: an assessment of poverty targeting and household impact using the LSMS and FISE household survey data; and review of the quality and utilization of social sector infrastructure and services through the examination of the facilities survey data; and an *in-depth* view of community priorities and participation through the qualitative beneficiary assessment.

### **FISE'S SUCCESS IN REACHING THE POOR**

Results of FISE's poverty targeting are assessed at the municipal level, and for the first time, at the community and household levels by comparing the poverty levels of FISE beneficiary households to the national distribution of poverty.

#### **Municipal Poverty Targeting.**

- 'Extremely poor' municipalities receive more FISE resources per capita than any other category of municipality and FISE resource allocation to the poorest municipalities has become more progressive over time.
- FISE water system investments were the most progressive in reaching municipalities in extreme poverty, as almost half of investments were directed to this group.
- Education and health projects were well targeted reaching extreme and high poverty municipalities.
- FISE's investments in environmental, municipal infrastructure and latrine projects were reasonably well targeted to municipalities with high poverty levels, but were regressive in targeting extremely poor municipalities.
- Social assistance investments (housing and early childhood development centers) were the most regressive, as less than 10 percent of investments were directed to municipalities in extreme poverty, and over 40 percent of investments went to the municipalities with medium or low poverty levels.

#### **Community Poverty Targeting**

- Results showed that both education and health investments were reasonably well targeted to potential beneficiaries: in education the poorest 40 percent receive just over 40 percent of investments; in health they receive 58 percent. The majority of FISE school and health investments are rehabilitations of existing facilities, therefore their location is predetermined by the line ministries.

- Sewerage investments are regressive with the poorest 40 percent receiving less than five percent of investments. This regressive targeting is partially explained by the nature of sewerage systems, which require a concentrated population to achieve economies of scale and a preexisting water system. Therefore, sewerage systems are generally located in urban areas, not poorer rural areas.
- Targeting for latrine and water investments was assessed only at the household level given the nature of the FISE intervention, which provides benefits directly to households.

### **Household Poverty Targeting**

- FISE latrine investments are very pro-poor, even for the poorest, with over one-third of investments targeting direct beneficiaries in the poorest one-fifth of the population, reflecting the fact that poorer households will be more likely to select latrine investments.
- FISE sewerage projects were very pro-rich, with the richest 30 percent of the population receiving close to 60 percent of investments. Households must finance both the cost of connecting to the sewerage system and the purchase of a toilet, further excluding poorer households. Water investments were distributed evenly across the population, favoring neither the rich nor the poor.
- Results showed that among poorer segments of the population targeting of both education and health investments was slightly less progressive at the household level than the community level, reflecting the fact that although FISE is generally successful in reaching poor communities, poorer households within the targeted communities are less likely to use FISE investments. This result underscores the challenge of reaching the poorer residents in a community through infrastructure investments alone.

**Targeting the Poorest of the Poor.** At both the community and household level, FISE has struggled in targeting the poorest.

- Only in primary education and latrine investments have FISE investments been progressively distributed among the 17 percent of the population living in extreme poverty as defined by the Poverty Assessment based on the 1998 LSMS, and only for latrines do these investments remain progressive for the poorest decile. These failures reflect the difficulties that most poverty alleviation programs face when trying to reach the poorest – these are typically households in remote areas that have very limited access to information and organizational capacity to solicit needed assistance.
- To reach the poorest, FISE must create a demand for its social services within these households that cannot come from supply-side interventions alone. If FISE's Red Social conditional cash transfer project succeeds in targeting the poorest, it should create incentives for these households to take advantage of education and health investments, since receiving the transfer is conditional upon school attendance and health check-ups. FISE should also consider including community outreach programs as a component of future health investments.

## **HOUSEHOLD IMPACT RESULTS**

The FISE Evaluation seeks to determine what role FISE has had in raising the living conditions of FISE beneficiaries, especially with respect to their health and education status. To assess these conditions, the evaluation compares FISE and non-FISE facilities and households in order to estimate the 'counterfactual': what the state of these facilities and households would have been without the FISE intervention. The evaluation addresses this question by constructing two comparison groups: the FISE Comparison Group and the Propensity Score Comparison Group. The evaluation does not have the

benefit of baseline data, but recall questions and administrative data have been used as a proxy for baseline data when possible.

The results of the household impact evaluation demonstrate a significant, robust impact of FISE primary education investments on education outcomes and point to a significant, probable impact of FISE water investments on health outcomes. FISE water and sanitation investments significantly improved access to these services, but no health impact is found on direct beneficiaries of sanitation (sewerage and latrine) investments. The results for FISE health investments point to a probable, significant impact on the utilization of FISE health posts to treat children with diarrhea, but point to no measured impact on health outcomes. Results by sub-project type are the following:

- **Impact of Primary School Education Projects.** Both comparison groups show that enrollment has increased as a result of FISE investments. Results also confirm FISE's impact in reducing the education gap (the difference between students' actual and ideal age) from approximately 1.8 years to 1.5 years, and show that the age at which children enter into primary school has significantly dropped from 8.6 years old to 7.9 years old due to FISE investments.

The two comparison groups in education give fairly consistent results. This suggests that the significant, positive impact of FISE primary education investments on enrollment, the education gap, and age in first grade are robust since the triangulation provided by the two methods yields similar results.

- **Impact of Rural Health Post Projects.** Both comparison groups confirm a significant rise in the use of FISE health posts to attend to children under six when they have diarrhea. This result may be constrained by the sample size, but the direction of the impact is supported by trends in the increased utilization of health posts observed in the LSMS and FISE household surveys and the FISE facilities survey. Looking beyond utilization rates, for none of the health outcomes do both comparison groups point to the same significant impact of FISE health post interventions. In several cases even direction of the impact is unclear. For example, the Propensity Comparison Group points, surprisingly, towards significantly higher incidence of respiratory infections than the FISE Treatment Group, but the FISE Comparison Group confirms neither the direction nor significance of the impact. We cannot therefore point to any measured impact of FISE investments in health posts on health outcomes other than a probable impact on utilization rates for treating infants with diarrhea.
- **Impact of Water Projects.** Results indicate a significant, positive impact of FISE investments on water supply. In areas where FISE invested, about 25 percent more households had access to piped water. In addition, distance to the nearest water source was reduced by 600 meters as a result of the FISE investment. FISE water investments had a significant, positive impact on stunting (height-for-age) in children under six, reducing the incidence of stunting from 25 percent to 14 percent. Other malnutrition and diarrhea variables all indicate an improvement in health status, but the results are not significant.
- **Impact of Sewerage Projects.** FISE had a significant, positive impact on access to sewerage systems. Without a FISE intervention, only 8.7 percent of households in the Propensity Comparison Group managed to obtain a flush toilet. None of the health related impact variables is significant, however results may be constrained by sample sizes.
- **Impact of Latrine Projects.** FISE latrine investments generated a net increase in access to sanitation facilities of close to 20 percent in the communities where they invested, above and beyond the change

that would have occurred without the FISE investment. No significant results were found for the impact on diarrhea or malnutrition as a result of FISE latrine investments.

- **Gender and Poverty Dimensions of Household Impact.** Both control groups confirm that (i) the impact of FISE education investments on enrollment is higher for girls; (ii) the education gap is reduced more for children from the poorer quintiles; and (iii) age at first grade is reduced slightly more for boys than for girls.

The lack of a measured impact of FISE health post investments on health outcomes underscores the difficulty of achieving a positive impact on health through supply-side infrastructure investments alone. Household health and hygiene practices and the supply side deficiencies revealed by the health post Facilities Survey with respect to medicines and personnel must be addressed to achieve a change in health outcomes.

### COMMUNITY PRIORITIES AND PARTICIPATION

- **Results from the Qualitative Beneficiary Assessment show that most participants were satisfied by their experience with FISE,** as over 80 percent of those participating in the implementation of a FISE project deemed the experience to be either satisfactory or extremely satisfactory. FISE projects were generally the most valued investment received by the community. Community participation in FISE investments was strong in identifying communities' needs but weak in project design, construction and supervision.
- **Government participation in project development was considered to be insufficient,** as 70 percent of participants believed that local governments did not participate in key aspects of project development. Participants also believed that line ministries were not able to adequately provide maintenance services; only half of those interviewed thought that the Ministry of Education's participation in FISE education projects was good or average, and less than half deemed the Ministry of Health's participation in health post maintenance to be good or average.

Since the fieldwork for this evaluation, FISE has made considerable efforts to strengthen community and local government participation in the project cycle. Specifically, FISE has launched a Municipal and Community Strengthening Program, launched in 1998 to increase local involvement in FISE projects.

### SUSTAINABILITY AND PROJECT LEVEL IMPACT

**The FISE Facilities Survey was used to conduct case studies of the utilization, operational and physical sustainability and community participation levels of FISE projects.** The impact of FISE interventions on health posts and primary schools was determined by comparing FISE and non-FISE projects. For water and sewerage systems, no comparison was made with non-FISE counterparts, so the evaluation of the facilities is conducted in a more descriptive manner highlighting features of FISE systems and explaining differences between projects that might account for their relative levels of success.

## • Health Post Results

### *Utilization*

- More people visit FISE health posts than non-FISE health posts.
- FISE health posts have experienced an increase in utilization since 1993, including a significant seven percent growth in female utilization rates from 1993 to 1997.

### *Operational and Physical Sustainability*

- FISE health posts have more staff and volunteers (19 vs. 13) as well as more professional staff (2.6 vs. 1.7) than non-FISE health posts. Levels for both total staff and professional staff have increased in FISE health posts since 1993, while both have declined in non-FISE health posts. Nonetheless, both FISE and non-FISE posts are understaffed relative to Ministry of Health (MINSA) standards.
- In both FISE and non-FISE health posts, just under 50 percent of the medicines that should be available according to MINSA standards are often not available. In non-FISE health posts, 31 percent of the required medicines are never available, as compared to 25 percent for FISE health posts.
- FISE health posts are better endowed than non-FISE posts with respect to periodically replaced medical materials, equipment and required furniture, although in no case are more than 65 percent of these inputs frequently available.

Despite MINSA's agreement to provide FISE health posts with staffing, medicines, and medical equipment prior to FISE's investment, FISE and non-FISE posts alike suffer from a lack of these inputs, suggesting that MINSA does not maintain its commitment. MINSA should pilot alternative service provision arrangements through subcontracts with NGO's to operate and supply rural health posts.

### *Community Participation*

- FISE posts report lower community participation in the infrastructure project design stage than do non-FISE posts, but higher participation in the construction phase. Project supervision was led by FISE or MINSA for FISE posts, and by MINSA for non-FISE posts. Participation by NGOs was higher for FISE posts in providing medical equipment, but non-FISE posts rely more on NGOs for medicine provision.

## • Primary School Results

### *Utilization*

- Enrollment rates have increased by one fifth in FISE primary schools, and have declined slightly in non-FISE primary schools. This increase in enrollment in FISE schools corresponds with a similar increase in the number of classrooms (from 4.6 to 6.0) resulting from the FISE intervention.

### *Operational and Physical Sustainability*

- The number of teachers and total staff in both FISE and non-FISE schools increased, but the increase was significantly greater for FISE schools.

- FISE schools have better access to piped water, electricity and bathrooms than non-FISE schools.
- In about 90% of all schools in the sample, more than half of the students have math and Spanish textbooks, with no discernible differences between FISE and non-FISE schools.

#### *Community Participation*

- Communities with both FISE and non-FISE schools participated in school design and construction, but participation rates were higher for non-FISE schools.

These results confirm the positive impact of FISE investments on enrollment and point to the role that non-infrastructure investments, especially the provision of teachers, have played in bringing about these improvements. Education is the area where FISE investments have had the clearest success, but this success is not attributable to FISE alone.

### • **Water Systems Results**

#### *Utilization*

- Connection rates are high overall; half of the water systems are functioning at above 100 percent capacity, whereas one system in Jinotega is functioning at under 50 percent capacity.

#### *Operational and Physical Sustainability*

- Five of the 10 sampled systems supply sufficient water, and five do not. The sufficient supply systems are generally in low poverty areas, use subterranean water sources, operate with electrical pumps, and are run by the Nicaraguan Water and Sanitation Institute (INAA). The majority of the insufficient supply systems are in higher poverty areas, are gravity-based systems with surface water sources, and are operated by the municipality. The successful systems supply water consistently; whereas the unsuccessful systems' water is rationed, offering water on average only three days a week.
- Construction periods for the unsuccessful systems were over twice as long as for the successful systems. Unsuccessful systems also report greater deterioration in their physical infrastructure.
- Maintenance activities are adequate overall, as the percentage of necessary activities carried out ranges from 67 percent for surface systems to 100 percent for subterranean systems.

#### *Community Participation*

- Community participation is either low or non-existent in all aspects of water systems: project solicitation, construction, operations, and maintenance.

FISE might consider providing water systems only for communities where INAA agrees to operate and manage the system, and to pilot new approaches to water provision.

These results point to two competing paradigms of FISE-supported water projects: (i) a successful model achieved jointly with INAA in wealthier areas, with a greater dependence on technology, resulting in the consistent availability of an ample supply of water; and (ii) a less successful model that relies on local government in poorer, more rural areas, with a technology dependent on regular rainfall and unable to



consistently provide an ample supply of water. INAA or others should explore more successful water system models to address the problems in low supply, poorer areas.

- **Sewerage Systems Results**

*Utilization*

- Eight of the ten projects in the sample were located in the Pacific Region, the geographic area with the lowest levels of poverty.
- Connection rates are universally low, with rates much higher in Managua (77 percent) than in the other areas (51 percent).

*Operational and Physical Sustainability*

- All of the systems in the sample are run by the Nicaraguan Water and Sanitation Institute (INAA). According to the administrators and communities, the presence of the systems have led to improvements in road conditions, the incidence of sickness, and the presence of insects, streams and puddles.
- Maintenance is regularly carried out in all of the systems (although with less frequency in the Managua network); however, the majority of the systems report problems in rainy periods.
- The five systems in Managua that are all part of a larger network lack water treatment facilities and dispose of their water directly in Lake Managua.

*Community Participation*

- Community participation in FISE sewerage projects is minimal; INAA was in charge of most aspects of soliciting, constructing and operating the sewerage systems, with FISE funding the necessary land purchases for the projects and sometimes supervising project construction.

The facilities survey results confirm the household survey results that point to FISE's provision of sewerage services to richer communities and households, and to the difficulties of households have encountered in financing connections to the sewerage system, even in relatively prosperous communities.

## POLICY IMPACT OF EVALUATION RESULTS

**The FISE evaluation has contributed directly to accelerating progress towards poverty reduction in Nicaragua by providing policy recommendations for FISE, line ministries and others responsible for the design and implementation of social sector policies.** As an immediate response to the evaluation results reviewed in a March 2000 workshop with FISE and its principal multilateral and bilateral supporters, FISE made two revisions to its project menu:

- **FISE has suspended the financing of new sewerage projects for two years, and will continue support for only a minority of current sewerage projects.**
- **FISE will begin financing more integrated infrastructure projects that will include components complementary to the basic physical plant, such as access roads and living quarters for staff.**

## ACTIONS AND RECOMMENDATIONS FOR FISE OPERATIONS

- **Emphasize the poorest of the poor.** Although extremely poor municipalities receive more FISE resources per capita than any other type of municipality and although FISE education and health investments are reasonably well-targeted to the poorest 40 percent of households, the targeting results conducted at the household level reveal that for those in extreme poverty (the poorest 17 percent of the population), FISE investments in all sub-project areas except latrines are either neutral or regressive. FISE needs to focus on how to reach the poorest of the poor, who have not benefited from their relative share of most types of FISE investments and who remain far behind the non poor in terms of their health, education and nutritional status. FISE's new "Red Social" pilot to provide conditional cash transfers will require a carefully thought out design as well as strong monitoring and evaluation to assess its ability to target the poorest of the poor and create incentives for investments in their human capital. FISE may also want to explore the expansion of promotion and outreach activities in very poor communities, particularly with respect to building an appreciation for health and education services among poor households.
- **Increase community participation at the sub-project level.** The results of the Qualitative Beneficiary Assessment report that communities feel that FISE could improve upon levels of community and local government involvement in FISE projects, particularly at the end of the project cycle during construction and once the project is completed with respect to maintenance. The microplanning process and the preventative maintenance funds that FISE introduced after the fieldwork for this evaluation was conducted may improve these shortcomings and should be considered in upcoming evaluations.
- **Review the balance between new social sector infrastructure investments and replacement, rehabilitation and expansion of existing infrastructure.** The results of the Poverty Assessment point to important gains among the poor in access to health and education – gains to which FISE has clearly contributed given its prominent role in providing these investments to the poor. FISE has moved strongly away from the provision of new investments, a move that may need to be re-examined given the results of the Poverty Assessment that suggest that physical distance to social services continues to impede access for the poor. This assessment and any resulting recommendations would, of course, need to be coordinated with a review of the capacity of line ministries or alternative providers to supply the required inputs to ensure the sustainability of any new infrastructure investments.
- **Focus on 'turnkey' infrastructure projects.** FISE should assess how to improve upon the number of sub-projects constructed with available, functioning basic services such as water and electricity. This is particularly important for health posts due to needed hygiene and medicine storage. As mentioned above, FISE should require the active participation of beneficiaries and local institutions to ensure that the infrastructure provided meets local expectations. FISE should also consider introducing an 'approval' process whereby the community and FISE would verify that the project has been fully completed.
- **Create an integrated, streamlined monitoring and evaluation system in order to ensure complementarity between short-term and longer-term evaluation activities.** FISE should also develop its technical capacity to rigorously evaluate pilot programs, building on its experience with this impact evaluation and the evaluation of the Red Social pilot project.

## RECOMMENDATIONS FOR FISE'S WORK WITH OTHERS

**FISE's greatest challenge is to actively engage other institutions to improve the provision of quality interventions for the poor.** Meeting this challenge will require working with other often less dynamic institutions and forging creative alliances to achieve stronger household-level impacts. This evaluation shows that where FISE is most successful in achieving impacts, FISE investments are linked with parallel improvements in non-infrastructure investments, including staffing and overall participation. This synergy is clear with respect to the positive impact of FISE investments in primary schools, and problematic with respect to FISE investments in rural health posts. The provision of infrastructure and training is necessary but is not alone sufficient to improve the human capital of the poor.

**As a first step in strengthening coordination between FISE and other institutions, a second workshop was held in October 2000 between FISE, the Ministry of Education (MoE), the Ministry of Health, INIFOM and ENACAL to discuss how to improve collaboration between FISE and line ministries to improve the impact of social sector investments.** The October 2000 workshop resulted in the discussion of concrete proposals on means for strengthening collaboration and the workshop participants agreed on creating a working group to follow up on the proposals with a concrete plan of action by the end of January 2001. This proposal will be reviewed for its potential to serve as basis for revised inter-institutional agreements between FISE and the line ministries regarding project approval. Below are several recommendations related to how FISE might move forward on building these coalitions, building on recommendations put forward in the October 2000 workshop.

- **Forge stronger links between communities, local governments, and local representatives of central government agencies, building upon Nicaragua's decentralization process.** FISE has already taken some potentially promising steps forward with the introduction of the microplanning process to engage municipal governments, communities and local representatives of line ministries in a locally led and oriented development process. In the municipalities, this process will require ongoing training and local capacity building tailored to the varying needs of different municipalities. These steps toward decentralization merit close monitoring and the microplanning process should be explicitly evaluated as part of the next Qualitative Beneficiary Assessment through a comparison of communities with and without the program.
- **Focus on balancing decentralization and strategic planning.** Line ministry officials issued a strong call for increased strategic planning to accompany decentralization, specifically through: improved inter-institutional coordination, the strengthened involvement of line ministries in the microplanning process, ongoing coordinated reviews of the balance between infrastructure requirements and sectoral norms and policies and complementary financing to improve both the strategic planning process itself and outcomes in beneficiary communities. On a practical technical level, line ministries also called for access to FISE's databases and coordination across sectors to establish a set of unique codes for all public sector establishments to allow for comparability across databases.
- **FISE and others should complement the supply of infrastructure with demand-side interventions by promoting direct contact with households to achieve desired household level outcomes and the participation of the poorest of the poor.** FISE's Red Social pilot should be monitored to assess the success of this demand side intervention. In addition, FISE, in coordination with the Ministry of Health or non-traditional health providers, should strengthen health outreach campaigns within communities receiving FISE investments.
- **Given the lack of a measured impact of FISE health investments on health outcomes that appear to be related to non-infrastructure deficiencies, MINSA should actively seek alternative**

**service provision arrangements.** It should consider contracting out health post management to NGO's to provide needed staffing, medical supplies, medicines and outreach. The results of this pilot, if implemented, should be evaluated with respect to achieving desired health outcomes. If the desired outcomes are not achieved, MINSA should continue to seek alternative approaches and FISE should consider suspending the financing health post infrastructure projects.

- **Community contracting should be piloted in school infrastructure projects,** a request expressed by the Ministry of Education supported by their experience with community contracting for small infrastructure projects under the Ministry of Education's APRENDE Project.
- **FISE along with INAA and/or other water service providers should explore ways to improve water projects in poorer areas.** The variance in quality in FISE water projects underscores the recognized need for a more effective model of water provision in poorer, more rural areas not presently served by INAA. FISE and INAA or an alternative service provider should take advantage of contacts with the World Bank and others that have worked on developing effective rural water supply models to pilot some alternative approaches in Nicaragua.
- **FISE should use its position as the public-sector institution that has championed impact evaluation, poverty assessments and poverty maps for Nicaragua as a departure point for actively engaging public, private and NGO actors in a results-oriented dialogue to develop an effective, monitorable, outcome-based poverty-reduction plan.** Present initiatives in the social sectors are fragmented across institutions, without strong and coherent leadership. Results of these uncoordinated interventions are predictably poor, as evidenced by the 1998 Poverty Assessment. FISE has championed and financed in-depth poverty assessments, impact evaluations and the development of a valuable poverty map. FISE should apply its technical expertise and marshal the empirical evidence it has produced to engage the Government of Nicaragua in a substantive dialogue on poverty reduction. Specifically, FISE should disseminate the results of this evaluation and of the evaluation being applied to the 'Red Social' pilot cash transfer project, as well as the 1998 LSMS and Poverty Map, so as to better inform Nicaragua's social protection strategy. These instruments can provide insight into the use of effective poverty targeting mechanisms and empirical evidence from various policy interventions that can help shape the dialogue, programs and goals being developed with Nicaragua's principal creditors as part of the debt relief plan for Highly Indebted Poor Countries.

#### **RECOMMENDATIONS FOR FISE'S MONITORING AND EVALUATION SYSTEM**

- **Maintain the Link Between the LSMS and the FISE Evaluation.** Conducting the FISE Evaluation in conjunction with the LSMS using the LSMS questionnaire as the basis for the FISE Household Survey proved very useful in estimating the poverty targeting and impact of FISE projects. This approach should be maintained, as FISE is planning to conduct impact evaluations every four years.
- **Consider using the FISE Impact Evaluation to compare alternative interventions.** Future applications of the impact evaluation should consider exploring a particular intervention or operational mode more intensively. For example, instead of having the projects grouped only by type of sub-project, the evaluation could contain a representative sample of beneficiaries of projects developed using the microplanning process compared to a representative sample not using the microplanning process. These types of stratifications could also be considered for the Qualitative Beneficiary Assessment.
- **FISE should consider building household and project level baseline data into future impact evaluations.** The availability of baseline data would enhance FISE's ability to effectively evaluate

the impact of its projects. Project-level baseline indicators should be collected as part of FISE's ex-ante appraisal system and integrated into FISE's management information system. Household-level baseline data should also be built in to the impact evaluation system.

- **Establish a technical unit in FISE to inform strategic planning and manage monitoring and evaluation activities.** FISE should consider establishing a small, agile technical unit to review and guide its targeting strategies (both geographical and individual), project design, monitoring and evaluation, including the evaluation of new initiatives such as the "Red Social" pilot. This unit should be staffed with technical specialists (economists, statisticians, and/or evaluation specialists) who would liaise with others in FISE to provide strategic planning for the institution. This unit could also be nurtured to provide leadership in the evaluation field in Nicaragua and form part of the technical team advising the Government of Nicaragua on setting and measuring benchmarks for poverty reduction.



# 1. INTRODUCTION

1.1 **Objectives of the FISE Ex-Post Evaluation:** Given FISE's recognized success in resource mobilization and central role in social infrastructure provision in Nicaragua, FISE and the World Bank launched the FISE Ex-Post Impact Evaluation to assess FISE projects' impact on (i) the health and education status of beneficiary households and communities and (ii) FISE's success in reaching poor communities and households. The evaluation addresses: the supply, utilization and impact of FISE investments; the sustainability of FISE investments; the targeting effectiveness of FISE investments; and the participation of local groups in designing, implementing and maintaining FISE infrastructure.

1.2 **Methodology:** The evaluation methodology compares FISE and non-FISE facilities and households in order to estimate the 'counterfactual': what the state of these facilities and households would have been without the benefit of a FISE's intervention. The evaluation addresses this question by matching FISE facilities and households to comparator facilities and households, and by comparing the results between the two groups. To provide robustness to the impact results, two comparator groups were used: one based on observed household characteristics and the other based on a geographic proximity-based matching of FISE and non-FISE facilities.

1.3 **Data Sources:** The evaluation makes use of the FISE Household Survey, which applied the questionnaire from the 1998 Living Standards Measurement Survey (LSMS) to a sample of FISE beneficiary households and comparator households to assess FISE's household impact. This approach also allows for comparisons between FISE beneficiary households and the national data determined by the 1998 LSMS. The evaluation also uses a FISE Facilities Survey to determine the status of FISE-supported schools, health posts, and water and sanitation facilities, and compares FISE health posts and primary schools to similar non-FISE facilities in neighboring communities. Finally, a Qualitative Beneficiary Assessment was applied to measure FISE's social impact as perceived by members of the community associated with the FISE investment.

1.4 **Collaborative Process:** The FISE Ex-Post Impact Evaluation was designed by the World Bank in collaboration with FISE's planning department and the National Institute for Statistics and Census. The evaluation process entailed continuous cooperation between the organizations, as well as missions from World Bank staff to Managua and FISE and INEC staff to Washington. As a result, FISE and INEC have been intricately involved in carrying out the evaluation, as well as producing, interpreting and applying the results. The FISE evaluation team has also worked closely on conducting a cost-efficiency analysis of FISE subprojects as well as updating the FISE Poverty Map using the results of the 1998 LSMS. The results of these efforts are being presented in separate reports.

1.5 **The FISE Ex-Post Impact Evaluation has actively contributed to related capacity building and evaluation efforts.** First, the evaluation received the support of and contributed to the MECOVI (*Programa para el Mejoramiento de las Encuestas de Condiciones de Vida en America Latina y el Caribe*) initiative aimed at strengthening survey development and analysis capacity in selected countries in Latin America. Second, the FISE evaluation team worked with the IDB, KfW, Research Triangle Institute and IDEAS to ensure that the Qualitative Beneficiary Assessment served as an integral component of the Ex-Post Impact Evaluation. Third, the FISE evaluation team worked closely with the World Bank-Government of Nicaragua team responsible for the 1998 Living Standards Measurement Survey (LSMS) and Poverty Assessment to provide a basis for assessing FISE's role in addressing poverty reduction in Nicaragua. Finally, the FISE evaluation is one of the cases selected for inclusion in the World Bank research project "Social Funds 2000" being jointly managed by PREM and HD to explore the household impact, targeting, sustainability and cost-effectiveness of the Armenian, Bolivian, Honduran, Nicaraguan, Peruvian and Zambian social funds.

**1.6 Policy Impact of the FISE Evaluation:** The results of the Ex-Post Impact Evaluation have been actively applied to inform policy in Nicaragua. The results served as the foundation for a policy workshop held in Managua in March 2000 with all the FISE managers and staff from FISE's principal multilateral and bilateral supporters, including the World Bank, IDB, KfW, SIDA and USAID. The results of this study are already being used to inform not only revisions of FISE's operations, but also inputs to Nicaragua's Poverty Reduction Strategy.

**1.7 Organization of the Report:** **Chapter 2** provides a description of FISE's evolution from its establishment in 1990 to the present, and reviews FISE's contribution to the provision of social sector infrastructure in Nicaragua. In **Chapter 3** we review the objectives of the FISE Ex-Post Evaluation to assess: poverty targeting, household impact, project sustainability, and cost-efficiency. Background on the data and sample selection for the household and facility surveys is provided in **Chapter 4**. In **Chapter 5** FISE's targeting mechanisms, notably the evolution of the Poverty Maps, are discussed, and in **Chapter 6** we review targeting by assessing the distribution of FISE projects across municipalities, communities and households according to their levels of poverty. The impact evaluation methodology and the results of FISE's impact at the household level with respect to coverage as well as health and education outcomes are covered in **Chapter 7**. Qualitative evidence of community and government participation and FISE responsiveness to community priorities is reviewed in **Chapter 8**. The results of the FISE Facilities Survey regarding FISE projects' physical and operational sustainability, utilization and community participation are discussed in **Chapter 9**. **Chapter 10** discusses the impact that the evaluation has already had on poverty reduction policies, provides recommendations regarding further actions and discusses lessons learned from the evaluation.



## 2. FISE GOALS AND EVOLUTION

### INTRODUCTION

2.1 **Nicaragua's social fund follows the general outline of social funds worldwide.** Many countries developed social funds in the early 1990's to serve as a temporary safety net during structural adjustment and state modernization programs. Social fund investments target poor communities, largely in rural areas, through the provision of basic social and economic infrastructure in accordance with the expressed needs of beneficiary communities. Social investment funds function in a decentralized, demand-driven manner, with the goal of building human and physical capital in the most disadvantaged populations.

2.2 **Nicaragua's Emergency Social Investment Fund (*Fondo de Inversión Social de Emergencia* – FISE) was created in 1990 to mitigate the effects of the economic stabilization program.** Like many other social funds, FISE's mandate has grown beyond that of providing a safety net and generating employment to playing a key role in improving living conditions and development opportunities among the poorest segments of Nicaragua's population. It seeks to accomplish this goal by improving the quality and sustainability of priority social infrastructure in poor areas in accordance with community demands.

2.3 **Small, community-based projects have added up to large investments in social and economic infrastructure.** As of the end of 1998, FISE had financed 6,017 subprojects in the area of social, economic and environmental investments worth US\$191.1 million, with the bulk of FISE spending going to the area of social infrastructure, including projects targeting education, health, water and sewerage (Table 2.1).

2.4 **FISE forms an integral component of the Government of Nicaragua's (GON) goal to improve the accessibility, sustainability and quality of social services provided to the poor.** FISE

Investment Sector	US\$ Million	% of Total Investments	% of Total Projects
Social Assistance	4.1	2.1	1.1
Environment	1.6	0.8	0.3
Municipal Infrastructure	30.1	15.7	5.4
<b>Social Infrastructure</b>			
Education	109.7	57.4	66.5
Health	28.3	14.8	25.0
Water and Sewerage	17.4	9.1	1.7
<b>TOTAL</b>	<b>191.1</b>	<b>100.0</b>	<b>100.0</b>

Source: FISE Administrative Data

carries out this mandate by financing the construction and rehabilitation of social investments on behalf of the line ministries and communities and by developing mechanisms for ensuring the sustainability and quality of these investments.

2.5 **Recently, FISE has focused on combining its financial role with that of strengthening the planning and implementation capacity of local governments.** In 1997 FISE introduced a "microplanning" process to promote joint planning activities between local and national governments and

communities aimed at identifying and prioritizing projects. FISE has also opened the first of several regional field offices and introduced a pilot project to explore the municipal management of subprojects. Finally, it has also introduced a preventative maintenance fund to promote local project sustainability. Current efforts to promote the decentralization of FISE to local governments mirror a larger strategy in Nicaragua to increase efficiency in the provision of public goods and services.

## FISE INSTITUTIONAL ARRANGEMENTS

2.6 **FISE's institutional autonomy has been key to its flexibility.** FISE was not created under the authority of any specific line ministry, but rather was established as an independent entity directly under the Office of the Presidency. In order to facilitate its operational efficiency, FISE was exempted from a series of administrative and legal norms governing salaries, procurement and recruitment that have traditionally limited the capacity of state entities. As a result, FISE is able to attract high-level professional staff and operate much like a private sector agency.

2.7 **FISE has been very successful at mobilizing external resources which provide over 90 percent of its operating budget.** Table

2.2 summarizes the resources mobilized by FISE from 1991-1999. The InterAmerican Development Bank (IDB) and the World Bank have served as FISE's two primary funding sources, providing over 70 percent of FISE's external resources.

**TABLE 2.2**  
**External Resources Mobilized by FISE,**  
**1991-1999**

Source	US\$m
USAID	25.2
UNDP	0.9
CIDA	2.4
KfW	28.0
World Bank	82.7
SIDA	4.9
IDB	71.4
COSUDE	4.2
TOTAL	219.6

Source: FISE Administrative Data

## FISE CONTRIBUTIONS TO THE EXPANSION OF BASIC SOCIAL INFRASTRUCTURE

2.8 As shown in Table 2.3, from 1991-1998 FISE investments comprised almost 11 percent of total public investment in Nicaragua, representing a little more than 40 percent of total investments in social infrastructure and accounting for close to one percent of Nicaragua's GDP.

**TABLE 2.3**  
**Total Public Investment, Investments in Social Infrastructure and FISE Investments**  
**1991-1998**  
**US\$ millions**

Investment	1991	1992	1993	1994	1995	1996	1997	1998	Average
Total public	72.6	180.7	230.5	288.8	310.3	273.7	239.4	245.9	230.2
In social infrastructure	24.7	38.5	63.1	87.3	89.3	74.2	57.0	57.7	61.5
From FISE	12.2	13.3	15.0	24.7	34.0	32.9	34.8	24.3	23.9
<b>FISE Contribution</b>									
<b>-Percentages-</b>									
Total public investment	16.8	7.4	6.5	8.6	11.0	12.0	14.5	9.9	10.8
Investment in social infrastructure	49.5	34.5	23.8	28.3	38.1	44.4	61.0	42.1	40.2

Source: Bermudez 2000

2.9 **FISE plays a prominent role in providing social sector infrastructure.** In the period from 1991 to 1998, FISE accounted for almost half of all public sector investments in education, as well as a fourth of public sector health investments and seven percent of sanitation investments.

2.10 **The share of FISE investments in the construction of new infrastructure has declined steadily over time,** as shown in Table 2.4. In 1991, 64 percent of FISE funds were allocated to new construction, but by 1998 this share had fallen to 3 percent. Likewise, in 1991, only 34 percent of funds were allocated to project replacement, expansion or repair but this increased to 94 percent by 1998. This

shift in focus shows that FISE initially concentrated on expanding the reach of social infrastructure to communities without basic facilities, and then began to replace the inadequate infrastructure in other communities. In education investments, the bulk of the FISE sub-project portfolio, the trend away from new school construction should be examined since the recent Poverty Assessment reveals that 25 percent of children ages 7-12 in rural areas (and 17 percent overall) cite a lack of access to schools as the primary reason for not attending school, second only to economic need. In addition, the distance to primary schools appears to have increased since 1993, particularly for children in rural areas and the extreme poor. This probably reflects the fact that new school construction has not kept up with population growth and internal migration.

**Table 2.4**  
**Distribution of FISE Resources Across Investment Areas**  
**1991-1998, Percentage**

Type of Investment	1991	1992	1993	1994	1995	1996	1997	1998	Average 91-98
New Construction	64.3	30.0	14.4	17.1	16.2	19.6	21.4	3.2	23.2
Replacement, Expansion or Repair	33.5	41.2	73.7	63.7	66.6	58.3	69.4	94.3	62.7
Training/Other	2.2	28.8	11.9	19.3	17.2	22.1	9.2	2.6	14.2
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100.0</b>

Source: FISE Administrative Data

## FISE CURRENT MONITORING AND EVALUATION ACTIVITIES

**2.11 FISE and its financial supporters have developed several monitoring and evaluation procedures to measure the performance and effectiveness of FISE investments.** Current evaluation tools to measure project performance and impact on beneficiaries include the following:

- A system of **Key Performance Indicators** allows for local government and FISE officials to monitor progress in meeting FISE's objectives in each phase of the project cycle using administrative data from FISE's management information system. Indicators measured include: the total number of projects completed and the populations represented by these projects; the number of projects approved; the number of Community Monitoring Committees and the level of participation in these committees; the number of communities with access to FISE's Preventative Maintenance Fund (PMF); and the PMF's coverage of health posts and primary schools.
- The **Quality of Vertical Projects Monitoring System**, a management information system launched in 1998 and applied to a sample of vertical projects such as education and health infrastructure investments, evaluates the physical quality of FISE projects by measuring adherence to environmental standards, the quality of construction materials and processes, labor usage, costs and time frames to complete the projects. The evaluation takes place at various stages of the project cycle, identifies the origin of problems associated with the project and encourages dialogue between external supervisors, the construction team and FISE inspectors and coordinators that oversee project implementation.
- The annual **Qualitative Beneficiary Assessment**, launched in 1996 with financing from KfW and the Inter-American Development Bank and technical assistance from the Research Triangle Institute, takes place one or two years after the completion of a sample of FISE projects, and interviews individuals associated with the FISE investment including community members, focus group participants, direct users of the FISE investment and government technical staff. The qualitative assessment determines the priority that the community gave the FISE project relative to other

projects, satisfaction with the FISE investment, community participation, psychological well-being, employment generation, the level of participation of government entities, future priorities and community perceptions of FISE.

- Replicating the methodology developed for this evaluation, **Impact Evaluations** will be carried out every four years in conjunction with the Living Standards Measurement Survey (LSMS) to assess the impact, targeting and sustainability of FISE investments.

### 3. FISE EX-POST IMPACT EVALUATION OBJECTIVES

3.1 The objectives of the FISE Impact Evaluation are: (i) to determine the progress attained to date in achieving FISE's goal of improving the impact, sustainability and quality of social services provided to the poor; (ii) to evaluate FISE's contributions to the achievements observed; and (iii) to formulate policy recommendations for FISE, line ministries and others in order to accelerate future progress towards poverty reduction in Nicaragua.

3.2 **The evaluation focuses on the impact of FISE social sector infrastructure projects.** This focus was chosen because social infrastructure projects constitute the greatest number of subprojects and highest level of expenditures of the four areas of FISE investments, namely, social infrastructure, economic infrastructure, environment and social assistance.<sup>1</sup>

3.3 Because of the decision to focus the evaluation on subprojects comprising the bulk of the FISE portfolio, the specific sub-projects included in the evaluation are those in the social infrastructure area with the majority (62 percent) of FISE financing from 1991-1996, namely:

- primary schools (40 percent of expenditures)
- health posts (six percent of expenditures)
- latrine (10 percent of expenditures)
- water and sanitation systems (six percent of expenditures)

3.4 **The FISE Impact Evaluation considers projects that were completed between January 1994 and June 1997.** The evaluation considers only FISE projects that were completed after 1993, the time when FISE shifted from financing short-term employment generation projects to long-term social infrastructure projects aimed at enhancing the effectiveness, sustainability and quality of social services provided to the poor. In addition, the evaluation does not consider projects completed after June 1997, because at least one year was deemed necessary after project completion in order to observe any impact of the FISE investment on project and household outcomes.

3.5 **Objectives of the Impact Evaluation.** The impact evaluation addresses three aspects of FISE interventions:

- **poverty targeting** at the municipal, community and household levels
- **the household impact of the investments** on utilization of social sector services and beneficiaries' health and education status
- **the project-level sustainability** and impact of FISE investments

#### POVERTY TARGETING

3.6 **This evaluation provides the first incidence analysis of FISE investments in poor communities and households.** FISE targets its investments using a poverty map based on the results of the 1993 Living Standards Measurement Survey (LSMS) which estimates municipal-level poverty and

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<sup>1</sup> Social Infrastructure investments constituted 41percent (1,904 out of 4,674) of the subprojects contracted and 64 percent (US\$91.7 million out of \$144.4 million) of the financing spent on contracted projects by FISE as of June 30, 1997.

which has been used to plan and monitor the geographical distribution of FISE investments across municipalities with differing levels of poverty.

**3.7 The evaluation considers FISE's targeting effectiveness through three optics:** (i) first, the evaluation reviews the poverty levels of the *municipalities* in which the FISE is operating as defined by the existing poverty map; (ii) second, the evaluation considered the poverty levels of the *communities* in which the FISE is operating (the potential beneficiaries) using the FISE household survey as compared to the results of the 1998 LSMS data; and (iii) third, the evaluation considers the poverty levels of those *households* actually using FISE interventions (the direct beneficiaries) using the FISE household survey as compared to the results of the 1998 LSMS data.

**3.8 The community and household level benefit incidence analysis takes advantage of the comparability between the FISE Ex-Post Impact Evaluation and the LSMS.** The assessment of FISE targeting at the community and household level is carried out by comparing the distribution of FISE beneficiaries to the national distribution of poverty as measured by the 1998 LSMS. This comparison was made possible through the application of the same household survey questionnaire in both the LSMS and the FISE household surveys in 1998. This questionnaire contains a consumption-based poverty measure which is obtained from each household by aggregating over all goods and services consumed by the household and normalizing for differences in household size and regional variations in prices. The poverty levels of FISE beneficiaries, both potential beneficiaries in the area of influence of FISE projects and direct beneficiaries using the FISE investments, are then compared to the national distribution of poverty, especially with respect to whether FISE beneficiaries are classified as 'poor' and 'extremely poor' as established by the full and extreme poverty lines, respectively.

**3.9 Efforts to update the current poverty map are also being supported as part of the Ex-Post FISE Impact Evaluation.** Using 1995 Census data combined with the results of the 1998 LSMS, the World Bank has been working with FISE, INEC and other government clients to update their current Poverty Map using a state of the art methodology. The technique being applied uses census data to predict consumption levels for sub-national areas, such as municipalities. Results of this effort are being published separately.

## HOUSEHOLD IMPACT

**3.10 Why look at the household level impact of FISE investments?** FISE's mandate is to provide quality social sector infrastructure to poor communities, responding to community demand. FISE's direct benefits are supposed to increase the quality and accessibility of basic services by improving the physical capital of communities' facilities such as schools, health posts, latrines, and water and sanitation systems. Next, it is assumed that changes in physical capital have an impact on the level of human capital formation in beneficiary communities by improving their health and education status.

**3.11 Key evaluation questions examined in this area** are: (i) is social service coverage higher in communities with FISE interventions; and (ii) is there any observable impact on the health and education status of the beneficiary population as a result of the FISE investments? These outcomes are examined primarily by analyzing the results of the household survey data used in the evaluation which allows for the comparison of FISE beneficiaries against comparison groups that have not benefited from FISE investments.

**3.12 Gender dimensions and poverty dimensions are also considered.** Given the importance of assuring that FISE interventions are accessible to and benefit men and women alike the evaluation also considered the gender dimension of the FISE interventions. The survey instruments were designed in collaboration with the World Bank's PREM Gender Division in order to facilitate this analysis. Impacts

have also been broken down by poverty quintiles using the consumption-based national distribution of poverty provided by the 1998 LSMS.

### PROJECT SUSTAINABILITY AND IMPACT

**3.13 Looking beyond the households to the projects and communities served by FISE, issues of sustainability arise mainly because FISE does not act in isolation.** At the *project level*, there are questions regarding general levels of service provision and use. Because the delivery of FISE interventions is directly tied to service provision by the line ministries and other service providers such as NGOs, the evaluation considers the availability of complementary inputs critical to ensuring the effectiveness of the FISE interventions that are not dependent upon FISE, including an adequate supply of medicines and textbooks, availability of qualified personnel, and the performance of required maintenance.

3.14 Turning to the *community*, the evaluation considers the participation of local groups in FISE investments. By design, social funds are financial agents set up to respond to community initiatives for social infrastructure projects. The hypothesis driving social funds is that the participation of local communities in identifying, building, and maintaining social service infrastructure will make social fund investments more appropriate, sustainable and utilized than investments carried out by other institutions. Indeed, participation has been shown in previous research to be critical to the utilization and sustainability of these investments (Sara and Katz, 1997). This evaluation considered the role of local groups and beneficiaries in the design, construction, operation and maintenance of the FISE investment.

3.15 This section addresses three main questions regarding operational, physical and community sustainability: (i) what is the level of *service provision and use* in social fund projects; (ii) what is the condition of the *physical infrastructure* and what are the levels of *maintenance* provided to ensure the longevity of the social infrastructure investments<sup>2</sup>; and (iii) what are *communities' perceptions, priorities and participation* with respect to FISE investments.

**3.16 To address these sustainability questions, the evaluation uses project-level data gathered at FISE and non-FISE facilities through the Facilities Survey as well as the results of the Qualitative Beneficiary Assessment** of the social impact of FISE projects concluded with financing from the Inter-American Development Bank. The municipalities included in the qualitative evaluation were selected as a sub-sample from the FISE Evaluation project and household surveys to ensure complementarity between the data sources.

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<sup>2</sup> The assessment of the projects' physical infrastructure carried out in the FISE Impact Evaluation is complemented by FISE's "vertical projects" monitoring system which considers the quality of the infrastructure upon delivery of the project. This monitoring system, which was introduced in 1998, provides a systematic assessment of the technical quality of the infrastructure of health, education and other vertical infrastructure projects.

## 4. SAMPLING AND DATA

### DATA

4.1 **The FISE Ex-Post Impact Evaluation uses four main sources of data** to consider the impact of FISE investments in primary schools, health posts, latrines, water and sewerage systems completed between January 1994 and June 1997. First, *facilities surveys* were applied in the schools, health posts, water and sewerage systems that received FISE funding.<sup>3</sup> Second, *household surveys* were applied in the corresponding households that benefit from the investments. Similar data were also collected from comparison institutions and households. Third, the FISE Ex-Post Impact Evaluation applied *aqualitative evaluation* to a sub-sample of communities that had received a FISE investment and been selected for the facilities and household survey. Finally, the FISE Ex-Post Impact Evaluation used *administrative data* from FISE to review the scope of FISE investments and for municipal level targeting. In the absence of baseline data, administrative data from schools and health posts were used to measure changes in enrollment or utilization as a result of the FISE interventions. (Please see Annex B for more information on sampling and data).

#### Facilities Data

4.2 Facilities data were provided by the FISE Facilities Survey of water and sewerage systems, health posts and primary schools. The FISE Facilities Survey consists of facility-specific questionnaires developed to evaluate the impact of FISE interventions completed between January 1994 and June 1997.<sup>4</sup>

#### Household Data

4.3 **Household data were produced by the 1998 LSMS and FISE Household Survey.** The same questionnaire that was used for the 1998 LSMS survey was also applied in the FISE Household Survey, which interviewed households either living in the area of influence of facilities that received a FISE investment or in the influence of a comparison group project, in order to determine FISE's poverty targeting and impact on individual beneficiaries. The use of the same questionnaire, applied at the same time by teams that had received the same training, allowed for comparability between the FISE household survey data and the LSMS national household survey data.

4.4 **The household survey captured basic socioeconomic data and collected information to establish a consumption-based poverty measure<sup>5</sup>.** The survey was accompanied by an *anthropometric module* to record the height and weight of all household members (except for disabled or elderly) and the conditions of pregnant women living in the sampled household. Also, a *price questionnaire* was utilized to construct a *consumption aggregate* in order to provide a consumption-based measure of poverty. The consumption aggregate formulated by the questionnaire served to classify households as extremely poor, poor and not poor relative to poverty lines, and also to separate households into consumption-based poverty quintiles.

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<sup>3</sup> Latrine investments were considered only through the household survey.

<sup>4</sup> Latrines were not included in the FISE Facilities Survey. As latrines benefit individual households, the assessment of FISE latrine interventions was conducted through the FISE Household Survey.

<sup>5</sup> See Chapter 6 on targeting for more information on the consumption-based poverty measure used in the FISE Evaluation.



## Qualitative Data

4.5 **Data from the Qualitative Beneficiary Assessment is used to evaluate the social impact of FISE projects** as perceived by government officials, facility personnel and direct FISE beneficiaries, using key informant interviews and focus groups. Overall, 246 key informant interviews were conducted with local officials, representatives from relevant line ministries, facility employees, members of community health and education committees, beneficiaries and project contractors.

4.6 **All data were collected in mid-1998 before Hurricane Mitch** hit Nicaragua in October 1998 and therefore present a pre-Mitch assessment of FISE's impact.

## SAMPLE

4.7 **The sample for the FISE Impact Evaluation was generated in two stages: first, for the facilities sample, then for the household sample.** The sample is representative of households benefiting from FISE investments and households in the comparison group, by type of subproject. The sample is not representative of facilities benefiting from FISE investments, nor is the household sample representative at any level beyond type of subproject.

- The **FISE facilities sample** of 131 FISE and non-FISE facilities was generated by selecting a random sample of FISE projects completed between January 1994 and June 1997, stratified by the five types of projects considered in the evaluation. Schools and health posts selected for the FISE Evaluation were then matched with the closest similar non-FISE facility not covering the same area of influence.
- The **FISE household sample** of 1312 FISE and non-FISE households took advantage of the application of the 1998 LSMS in May-September 1998 to jointly implement a FISE Household Survey applied to an oversample of households in the area of influence of the FISE and comparison group projects selected for the FISE Facilities Survey.<sup>6</sup>
- The **Qualitative Beneficiary Assessment sample** consists of 22 municipalities that had benefited from FISE investments completed from 1991 to 1996. The characteristics of the municipalities and the 43 FISE subprojects therein cover a balance between: urban and rural areas, different poverty classifications, and types of subprojects (21 primary schools, 15 health posts and seven sanitation projects). The municipalities in the beneficiary assessment sample were selected as a subsample of the communities chosen for the FISE Ex-Post Impact Evaluation to ensure comparability with the survey data.

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<sup>6</sup> The FISE Impact Evaluation also uses the data produced by the LSMS which is based on a nation-wide sample of households in rural and urban areas throughout Nicaragua. Overall, 4,040 households were included in the LSMS household survey and 1,312 households in the FISE Evaluation household survey.

## 5. POVERTY MAPS

5.1 **Since its inception FISE has used two geographical poverty maps that classify communities into 'extreme', 'high', 'medium' and 'low' poverty categories.** In 1992, FISE created its first poverty map, enabling the organization to allocate resources according to poverty levels determined by a basic needs indicator measurement. The map was an effective targeting tool; however, it tended to favor more densely populated municipalities, at the expense of rural communities. In 1998 FISE developed a new poverty map which made use of the 1995 Census and the 1993 LSMS. The 1998 poverty map utilized a consumption-based measure of poverty, and enabled FISE to target more accurately within municipalities and in sparsely populated areas, and therefore to allocate a greater percentage of resources to the extreme poor (Table 6.2). FISE is presently working with the World Bank and INEC to update its poverty map using the results of the 1998 LSMS combined with the 1995 Census.

### 1992 POVERTY MAP

5.2 **In 1992, FISE introduced a two-tier resource allocation system: sectoral and territorial.** FISE created a sectoral program of investments to be carried out over a period of three years, channeling 80 percent of its investments to health, education, water and basic sanitation projects in the most vulnerable areas of the country. Resource allocation was based upon effective demand for FISE services, the capacity of a community to process a FISE project, and the availability of funds for projects within each sector.

5.3 At the same time, a regional allocation of resources was carried out based on a geographical poverty map. The 1992 poverty map, which guided FISE's targeting strategy until 1997, used weighted measurements of three poverty indicators: (i) infant malnutrition – 40 percent; (ii) access to drinking water – 40 percent; and (iii) the proportion of displaced individuals in the community – 20 percent. The results of this measurement were then weighted to favor the poorest municipalities using a relative poverty indicator (RPI) method. This method measures income levels relative to the cost of a basket of basic goods. According to the RPI, municipalities were divided into three groups: (i) extreme poverty  $RPI > 49.89$ ; (ii) high poverty  $25 < RPI < 49.89$ , and (iii) medium and lower poverty  $RPI < 25$ . Finally, the poverty map was weighted by municipal populations using estimates based on the 1971 Census.

5.4 **In the period 1991-1997, the 42 municipalities classified as 'extremely poor' based on the unmet basic needs of the 1992 map received 20 percent of FISE resources.** The new map introduced in 1998 resulted in a re-classification of municipalities and influenced the allocation of FISE resources across municipalities, resulting in a higher percentage of allocations to 'extremely poor' municipalities (Table 5.1).

### 1998 POVERTY MAP

5.5 **In 1998 FISE introduced a new poverty map that used data from the 1993 LSMS and the 1995 Census.** In 1993, the first LSMS was applied to 4,454 households in rural and urban areas. The LSMS is representative at the regional level (for Nicaragua's seven regions) and provides consumption-based poverty measures. The 1995 Census replaced the population projections of the 1971 census. The new population figures were integrated into the 1998 poverty map, changing FISE's resource allocation. The new population figures showed an overall rise in extreme poverty of 12.6 percent, a rise in high poverty of almost three percent, and an almost three percent drop in the population above the poverty line.

**5.6 Using the results of the 1993 LSMS and the 1995 Census, FISE was able to update the poverty map using the consumption-based measure of poverty provided by the LSMS.** FISE introduced a consumption-based poverty estimate consistent with that used in the LSMS that made use of: (i) statistical regression analyses to estimate the expected poverty levels for small areas by using census data to impute consumption based poverty levels as established in the LSMS; and (ii) decomposing the LSMS into municipal measures of poverty. The result of these efforts was a new municipal level poverty map that classified all of the country's municipalities in terms of: (i) the number of rural and urban poor in each municipality; and (ii) the severity of poverty. The severity of poverty was measured by a poverty gap indicator, which permitted differentiation between different levels of poverty (i.e. the gap between a poor person's income level and the poverty line). The magnitude of the poverty gap corresponds to the extra annual income the poor population of a municipality must receive to reach the poverty line.

**5.7** In order to determine the amounts to be invested in a municipality with the new poverty map, FISE weighs the proportion of the municipal poverty gap against the nation-wide absolute poverty gap, which allows it to assign more resources to the municipalities where poverty is most severe and achieve greater equity in the distribution of investments and benefits.

**5.8 FISE and the World Bank are presently working to update the 1998 Poverty Map with the results of the 1998 LSMS,** using a revised methodology that again takes advantage of the 1995 Census to estimate consumption-based expected poverty measures of small areas.

#### **THE PARTICIPATORY MICROPLANNING PROCESS AS A TARGETING INSTRUMENT**

**5.9** FISE's targeting practices have been recently modified through the introduction of a participatory microplanning process, through which community leaders, local government officials, line ministry officials and FISE representatives work together to channel FISE investment benefits toward the poorest members of the community. Where sample sizes permit, FISE will work with municipal representatives to divide municipalities into microregions that are then analyzed and classified according to their poverty levels, using the new information provided by the updated poverty map. These results can be used to target and distribute resources within a municipality (assigning more of the resources allocated to a municipality to the poorest microregions). Prior to signing the agreement formalizing a FISE investment within a particular municipality, FISE can perform an analysis of the distribution of the proposed investment in order to verify that the per-capita investment is greater in the poorest parts of the community.

## 6. POVERTY TARGETING: METHODOLOGY AND RESULTS

6.1 **This section addresses FISE poverty targeting at the municipal, community and household level.** The analysis of municipal-level targeting uses FISE administrative data on the distribution of its investments across municipalities as classified by the poverty levels of municipalities according to the 1992 and 1998 FISE Poverty Maps. Second, we examine the incidence of FISE investments by the poverty level of communities and households using the results of the FISE household survey as compared to the LSMS household survey. This latter assessment is conducted for FISE social infrastructure investments considered by the Ex-Post Impact Evaluation: health posts, primary schools, latrines, water and sewerage.

6.2 **The FISE Ex-Post Impact Evaluation provides the first opportunity to examine the poverty levels of the individual communities and households benefiting from FISE investments,** whereas FISE administrative data and poverty map data have been available to assess targeting at the municipal level. All estimates assume an equal benefit across recipients of the intervention.

### POVERTY TARGETING AT THE MUNICIPAL LEVEL ACCORDING TO THE POVERTY MAPS

6.3 This section first reviews FISE financial resource allocation, then FISE project allocation across municipalities classified as being in 'extreme', 'high' and 'medium and low' poverty according to the 1992 and 1998 FISE poverty maps described above. We assess the progressiveness of FISE investments and projects by comparing them to population distributions across 'extreme', 'high' and 'medium and low' poverty municipalities.

### FISE Resource Distribution across Municipalities using the Poverty Maps

6.4 **'Extremely poor' municipalities receive more FISE resources per capita.** As shown in Table 6.1, in the 1991-1998 period, municipalities ranked as 'extremely poor' according to the 1992 and 1998 FISE Poverty Maps received considerably more FISE investments *per capita* than municipalities in any other poverty category (US\$6.25 annually versus a national average of US\$4.98). Only 23 percent of FISE's *overall* resources have gone to municipalities classified as 'extremely poor' but these municipalities account for less than 20 percent of Nicaragua's population, pointing to slight progressiveness in FISE's investment allocation across municipalities.

Municipal Poverty Ranking	Number of Municipalities 1992/1998 Map	% of Population 1992/1998 Map	Total Investment Amounts 1991-1998 (US\$ millions)	US\$ Per Capita Average Annual Investment Amount 1991-1998
Extreme	42/44	18.4/17.1	43.6 (22.8%)	6.25
High	96/69	51.6/36.1	101.7 (53.2%)	5.33
Medium and low	9/34	30.0/46.8	46.1 (24.1%)	3.79
<b>TOTAL</b>	<b>147</b>	<b>100.0</b>	<b>191.34 (100.0%)</b>	<b>4.98</b>

Source: Bermudez 2000 and authors' calculations

**6.5 FISE resource allocation to 'extremely poor' municipalities has become more progressive over time.** As illustrated in Table 6.3, the share of FISE investments going to 'extremely poor' municipalities has risen steadily from 11 percent in 1991 to over one-third of investments in 1998. FISE attributes its increased capacity to target poorer regions to a change of organizational strategy from a centralized entity concentrated on project execution and supervision to a stronger focus on project promotion and preinvestment activities.

**6.6 The progressiveness of FISE investments varies by type of subproject investment.** FISE water system investments were the most progressive in reaching municipalities in extreme poverty, as almost half of investments were directed to this group. At the same time, education and health projects were well targeted on a municipal level with respect to reaching extreme and high poverty municipalities. In contrast, social assistance investments were the most regressive, as less than 10 percent of investments targeted communities in extreme poverty, and over two fifths of investments went to the municipalities with medium or lower poverty levels. FISE's investments in environmental projects were poorly targeted with respect to extremely poor municipalities, but were well targeted to high poverty municipalities. Municipal infrastructure investments and latrine investments were also targeted to high poverty municipalities (53 percent and 47 percent), but were regressive in targeting extremely poor municipalities (15 percent and 18 percent).

<b>Table 6.2: Distribution of FISE Investments by Sector and Poverty Category (%)</b>									
Sector/poverty category	1991	1992	1993	1994	1995	1996	1997	1998	Average
<b>Social Assistance</b> <sup>7</sup>	0.0	0.0	3.9	2.8	0.8	2.4	3.0	2.9	2.1
Extreme	0.0	0.0	0.0	0.0	27.4	9.3	0.0	35.4	9.7
High	0.0	0.0	51.3	52.7	60.0	59.0	66.1	10.3	50.3
Medium and low	0.0	0.0	48.7	47.3	12.7	31.7	33.9	54.3	40.1
<b>Education</b> <sup>8</sup>	21.4	42.9	74.3	51.7	63.0	49.0	61.7	76.4	57.4
Extreme	13.3	20.8	17.8	21.0	24.0	29.9	22.0	35.6	25.0
High	68.4	57.4	50.8	67.0	59.9	46.6	53.6	39.4	53.2
Medium and low	18.3	21.8	31.5	12.0	16.1	23.5	24.4	25.1	21.8
<b>Environment</b> <sup>9</sup>	0.0	6.9	0.0	0.3	0.6	0.6	0.6	0.0	0.8
Extreme	0.0	0.0	0.0	100.0	0.0	23.5	0.0	0.0	6.6
High	0.0	100.0	0.0	0.0	47.9	76.5	40.4	0.0	78.4
Medium and low	0.0	0.0	0.0	0.0	52.1	0.0	59.6	0.0	15.0
<b>Municipal Infrastruc.</b> <sup>10</sup>	72.0	28.3	9.3	14.8	11.7	12.0	13.0	0.0	15.7
Extreme	9.2	14.6	22.5	27.0	25.4	9.3	9.5	0.0	14.9
High	50.4	58.5	50.8	43.2	63.7	41.8	63.6	100.0	53.2
Medium and low	40.4	27.0	26.7	29.8	10.9	48.9	26.9	0.0	32.0
<b>Health</b> <sup>11</sup>	2.6	10.0	4.7	15.3	9.8	7.5	3.2	11.3	8.3
Extreme	10.7	36.0	24.8	17.6	16.3	79.6	42.5	26.9	32.1
High	22.2	45.9	71.8	82.2	78.9	37.0	52.9	39.2	60.2
Medium and Low	67.1	18.1	3.4	0.2	4.8	-16.5	4.6	34.0	7.8
<b>Latrines</b>	2.0	8.6	0.2	11.1	8.4	15.8	0.7	0.0	6.5
Extreme	5.6	21.9	0.0	18.2	17.2	15.1	84.2	0.0	18.1
High	72.4	32.4	0.0	46.2	51.2	49.1	15.8	0.0	47.0
Medium and Low	22.0	45.8	100.0	35.6	31.5	35.8	0.0	0.0	34.9
<b>Sewerage</b>	0.0	1.1	4.0	2.8	1.9	9.1	9.8	3.9	4.9
Extreme	0.0	0.0	68.3	0.0	0.0	0.0	27.4	60.9	20.4
High	0.0	100.0	0.0	36.0	13.1	55.2	68.3	4.4	47.7
Medium and Low	0.0	0.0	31.8	64.0	86.9	44.8	4.4	34.7	31.9
<b>Water</b>	1.9	2.2	3.5	1.2	4.0	3.7	8.0	5.6	4.2
Extreme	100.0	23.1	87.7	0.0	36.2	37.6	82.0	0.0	49.5
High	0.0	0.0	0.0	0.0	27.4	42.4	7.0	58.9	23.3
Medium and Low	0.0	76.9	12.4	100.0	36.4	20.1	11.0	41.1	27.2
<b>Total</b>	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Extreme	11.4	18.6	19.5	19.8	22.8	25.8	21.4	33.6	22.8
High	53.4	57.5	50.6	61.9	59.1	46.1	57.8	38.2	53.2
Medium and low	35.2	23.9	29.9	18.3	18.2	28.1	20.9	28.2	24.1

Source: Director of Information, FISE, October 1999

<sup>7</sup> Housing; child care and nutrition centers.

<sup>8</sup> School committee training, technical vocational schools, teaching equipment, preschools and primary schools, school gardens, secondary schools.

<sup>9</sup> Reforestation.

<sup>10</sup> Rain drainage systems, municipal markets, bridges, slaughterhouses, roads, and other economic infrastructure.

<sup>11</sup> Hospitals, training for health committees, health posts, health equipment, basic preventative health.

Sector/Poverty Category	1991	1992	1993	1994	1995	1996	1997	1998	Total
<b>Soc. Assistance<sup>12</sup></b>		0	587.9	698.9	260.7	780.3	0	699.5	4,055.2
Extreme	0	0	0	0	71.3	72.9	0	247.5	391.7
High	0	0	301.5	368.6	156.3	460	679.5	71.9	2,037.8
Medium and low	0	0	286.4	330.3	33.1	247.4	348.4	380.1	1,625.7
<b>Education<sup>13</sup></b>	2,611.1	5,715.6	11,117.5	12,757.8	21,344	16,104.5	21,537.3	18,650	109,837.8
Extreme	347.8	1,189.3	1,972.9	2,673.4	5,124	4,815	4,747.4	6,630.7	27,500.5
High	1,785.6	3,282.1	5,642.6	8,550.8	12,781.1	7,511.2	11,544.7	7,345.1	58,443.2
Medium and low	477.7	1,244.2	3,502	1,533.6	3,438.9	3,778.3	5,245.2	4,674.2	23,894.1
<b>Environment<sup>14</sup></b>	0	917.9	0	61.4	215.7	185.4	210.8	0	1,591.2
Extreme	0	0	0	61.4	0	43.5	0	0	104.9
High	0	917.9	0	0	103.3	141.9	85.1	0	1,248.2
Medium and low	0	0	0	0	112.4	0	125.6	0	238
<b>Municipal Infra.<sup>15</sup></b>	8,791.5	3,773.1	1,388.2	3,647.6	3,961.9	3,951	4,545.7	0.5	30,059.5
Extreme	812.7	549.7	312.9	985.7	1004.4	366.2	431.7	0	4,463.3
High	4426.6	2205.8	705.1	1573.8	2525.3	1651.4	2890.5	0.5	15,979
Medium and low	3552.2	1017.4	370.1	1088.1	431.9	1933.2	1223.3	0	9,616.2
<b>Latrines</b>	243.3	1,138.0	36.6	2,741.8	2,861.3	5,210.9	257.9	0.0	12,490.0
Extreme	13.7	249.1	0.0	498.0	493.2	789.0	217.2	0.0	2,260.2
High	176.1	368.2	0.0	1,267.7	1,465.6	2,555.8	40.7	0.0	5,874.1
Medium and low	53.6	520.7	36.6	976.2	902.5	1,866.2	0.0	0.0	4,355.8
<b>Health<sup>16</sup></b>	321.5	1,335.3	701.2	3,786.3	3,335.2	2,458.2	1,100.1	2,759.8	15,797.7
Extreme	34.3	481.0	174.1	666.4	544.6	1,955.5	467.1	742.0	5,064.8
High	71.4	612.2	503.6	3,113.4	2,629.7	909.0	582.2	1,080.4	9,502.1
Medium and Low	215.9	242.2	23.5	6.5	161.0	-406.3	50.7	937.4	1,230.8
<b>Sewerage</b>	0.0	142.3	603.3	700.2	638.9	2,992.7	3,414.3	943.4	9,44
Extreme	0.0	0.0	411.7	0.0	0.0	0.0	934.6	574.7	1,92
High	0.0	142.3	0.0	252.4	83.5	1,652.6	2,331.3	41.8	4,504
Medium and Low	0.0	0.0	191.5	447.8	555.4	1,340.0	148.4	326.9	3,010
<b>Water</b>	235.4	293.8	521.9	303.3	1,352.5	1,217.1	2,806.1	1,369.6	8,099.9
Extreme	235.4	68.0	457.4	0.0	489.1	457.6	2,300.6	0.0	4,008.1
High	0.0	0.0	0.0	0.0	370.8	515.4	196.7	807.1	1,890.1
Medium and low	0.00	225.82	64.47	303.30	492.64	244.15	308.79	562.56	2,201.72
<b>Total</b>	12,202.8	13,316.1	14,956.5	24,697.3	33,970.2	32,900.2	34,900.2	24,422.8	191,366.4
Extreme	1,390.5	2,474	2,917.3	4,884.8	7,731.5	8,497	7,467.4	8,194.8	43,557.3
High	6,513	7,654.1	7,564.5	15,288.4	20,065.2	15,158.7	20,155.4	9,321.7	101,721
Medium and low	4,299.4	3,188.1	4,474.6	4,524.2	6,173.5	9,241.9	7,277.4	6,881.3	46,060.4

Source: Director of Information, FISE, October 1999

<sup>12</sup> Housing; child care and nutrition centers.

<sup>13</sup> School committee training, technical vocational schools, teaching equipment, preschools and primary schools, school gardens, secondary schools.

<sup>14</sup> Reforestation.

<sup>15</sup> Rain drainage systems, municipal markets, bridges, slaughterhouses, roads, and other economic infrastructure.

<sup>16</sup> Hospitals, training for health committees, health posts, health equipment, basic preventative health.

**6.7 FISE water investments are very well targeted to municipalities in extreme poverty.** Almost half of FISE water investments target municipalities in extreme poverty, 23 percent of investments target high poverty municipalities, and 27 percent target municipalities with medium or lower poverty levels.

**6.8 Health sector investments, which represent over eight percent of investments, are progressive.** Municipalities in extreme poverty received almost one third and municipalities in high poverty three fifths of FISE health investments. In contrast, municipalities in medium and low poverty received less than eight percent of the total health investments, demonstrating that FISE health services are well targeted to the poorest areas.

**6.9 FISE education investments are also progressive.** Tables 6.2 shows that FISE education projects demonstrate a progressive distribution across poverty categories: one fourth of total resources spent by FISE in education projects from 1991-1998 went to municipalities categorized as extremely poor; 53 percent to high poverty municipalities; and 22 percent to medium and low poverty municipalities. This allocation is pro-poor, with more resources being allocated to 'extreme' and 'high' poverty municipalities than would have been allocated using the population distributions across municipalities ranked according to the 1992 and 1998 Poverty Maps, as illustrated in Table 6.1. Tables 6.2 and 6.3 also point to improvements over time in the poverty targeting of FISE education investments to 'extremely poor' municipalities.

**6.10 Targeting for FISE sewerage projects is relatively neutral, and is slightly progressive for municipalities in extreme poverty.** Slightly more than one fifth of FISE sewerage investments targeted municipalities in extreme poverty, a higher relative percentage of FISE investments than the population percentages in extremely poor municipalities according to both the 1992 and 1998 poverty maps. Almost half of FISE sewerage investments targeted municipalities with high poverty levels, and almost one third targeted municipalities with medium or lower poverty levels.

**6.11 Municipal infrastructure investments are regressive.** In the municipal infrastructure sector, which received 16 percent of total FISE investments between 1991-1998, resource allocation was regressive. The municipalities in medium or lower poverty received proportionally greater FISE resources (one third of all FISE investments), and the municipalities in extreme or high poverty less (15 percent and 53 percent, respectively) compared to the overall distribution of FISE investments or population illustrated in Table 9.

### **FISE Project Distribution across Municipalities using the Poverty Maps**

**6.12 The distribution of FISE projects is also progressive.** In the period 1991-1998, one quarter of all FISE projects went to communities in extreme poverty, and over half went to communities in high poverty. The percentage of projects going to extreme and high poverty municipalities is higher than their respective share of population, using municipal classifications from both the 1992 and 1998 Poverty Maps (see Table 6.3).

**6.13 The distribution of types of projects within municipalities is similar across municipalities with different poverty levels.** Of the projects carried out in 'extremely poor' municipalities, 71 percent were in education, 23 percent in health, and under five percent were in municipal infrastructure, sanitation, and social assistance. These patterns are similar in high poverty municipalities and in medium and low poverty municipalities.



**TABLE 6.4**  
**Distribution of FISE Projects by Sector and Poverty Category**  
**(# of Projects)**

Sector/poverty category	1991	1992	1993	1994	1995	1996	1997	1998	Total 91-98
<b>Social Assistance</b> <sup>17</sup>	0	0	6	10	6	9	20	17	68
Extreme	0	0	0	1	3	2	4	4	14
High	0	0	3	5	2	2	8	3	23
Medium and low	0	0	3	4	1	5	8	10	31
<b>Education</b> <sup>18</sup>	75	245	503	514	838	380	1036	409	4000
Extreme	23	92	79	92	291	121	309	172	1179
High	30	99	131	273	343	127	405	163	1571
Medium and low	22	54	293	149	204	132	322	74	1250
<b>Environment</b> <sup>19</sup>	0	5	0	1	2	8	2	0	18
Extreme	0	0	0	1	0	2	0	0	3
High	0	3	0	0	0	5	1	0	9
Medium and low	0	2	0	0	2	1	1	0	6
<b>Municipalities</b> <sup>20</sup>	98	41	19	43	52	34	36	1	324
Extreme	23	11	7	15	20	1	1	0	78
High	31	14	7	10	20	14	15	1	112
Medium and low	44	16	5	18	12	19	20	0	134
<b>Health</b> <sup>21</sup>	35	98	40	499	279	302	179	70	1,502
Extreme	2	11	16	80	54	57	55	18	293
High	22	49	11	268	121	148	81	33	733
Medium and low	11	38	13	151	104	97	43	19	476
<b>Sanitation</b> <sup>22</sup>	6	6	7	8	21	18	23	16	105
Extreme	6	2	4	0	4	2	9	1	28
High	0	2	0	2	4	8	7	3	26
Medium and low	0	2	3	6	13	8	7	12	51
<b>Total</b>	<b>214</b>	<b>395</b>	<b>575</b>	<b>1,075</b>	<b>1,198</b>	<b>751</b>	<b>1,296</b>	<b>513</b>	<b>6,017</b>
Extreme	54	116	106	189	372	185	378	195	1,595
High	83	167	152	558	490	304	517	203	2,474
Medium and low	77	112	317	328	336	262	401	115	1,948

Source: Director of Information, FISE, October 1999

<sup>17</sup> Housing; child care and nutrition centers.

<sup>18</sup> School committee training, technical vocational schools, teaching equipment, preschools and primary schools, school gardens, secondary schools.

<sup>19</sup> Reforestation.

<sup>20</sup> Rain drainage systems, municipal markets, bridges, slaughterhouses, roads, and other economic infrastructure.

<sup>21</sup> Hospitals, training for health committees, health posts, health equipment, basic preventative health, latrines.

<sup>22</sup> Water and sewerage systems.

## FISE TARGETING AT THE COMMUNITY AND HOUSEHOLD LEVEL

### Methodology for Assessing Community and Household Targeting

6.14 We apply incidence analysis to assess FISE's community and household level targeting, using the FISE and LSMS household survey data. We thus have two evaluation questions to answer:

- How are the FISE investment distributed among communities (potential beneficiaries)?
- How are the FISE investments distributed among households (direct beneficiaries)?<sup>23</sup>

6.15 This analysis is applied to FISE social infrastructure subprojects selected for the Ex-Post Impact Evaluation by examining the corresponding household data. To examine the benefit incidence at each level, we compare the consumption distribution of FISE households obtained from FISE Household Survey with the distribution of consumption levels in Nicaragua from the 1998 LSMS.<sup>24</sup>

6.16 **Why use a consumption-based poverty measure?** The decision to use a consumption-based poverty measure to evaluate targeting took into account the following reasoning: (i) consumption levels generally fluctuate less than income levels (people use savings to smooth out consumption in periods of low income) and are therefore considered a more accurate poverty indicator; (ii) data on consumption tend to be more accurate than data on income, as people often do not account for informal or in-kind income; and (iii) consumption based poverty measures are more objective than basic needs indicators, since they are based on empirical evidence and are not subject to as many differing definitions and weighting systems. The consumption-based measure for both the LSMS and FISE Household Survey aggregates total consumption, including annual consumption of food (including purchased and non-purchased food and including own production), housing, durable goods, spending on consumer goods and services, basic services (water, gas, electricity), and outlays on health and education. Information on the number of household members and the composition of the household was used to convert household consumption into a measure of per capita welfare. A price questionnaire was included to account for price differences between regions.

6.17 **Using the consumption aggregate derived from the LSMS, individuals were separated into poverty categories: non-poor, poor and extremely poor.** Individuals classified as extremely poor were those that fell below the *extreme poverty line*, which represents consumption levels equal to the cost of acquiring the minimum caloric intake recommended for Nicaragua. The Poverty Assessment based on the 1998 LSMS data reports that 17.3 percent of Nicaraguans live in extreme poverty (7.6 percent in urban areas and 28.9 percent in rural areas). Individuals classified as poor were those that fell below the *full poverty line*, which consists of consumption levels equal to the costs of acquiring the minimum caloric intake (the same as measured by the extreme poverty line) plus an allowance for non-food items.<sup>25</sup>

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<sup>23</sup> An assumption made throughout this analysis will be that every individual living in the area of influence (potential beneficiary) or utilizing the service (direct beneficiary) benefits equally.

<sup>24</sup> The targeting analysis assumes that the FISE investment did not have a direct impact on per capita consumption. Only with baseline data would we be able to test this assumption.

<sup>25</sup> **Poverty line:** A person is considered poor if his/her annual expenditure falls below the "full poverty line" established at \$343.46. The full poverty line is defined as the necessary level of *annual per capita consumption* at which a person attains the minimum caloric requirements. This measure takes into account non-food items such as clothing and transportation. **Extreme poverty line:** A person is considered extremely poor if his/her annual expenditure falls below the "extreme poverty line" established at \$181.12. The extreme poverty line is defined as the necessary level of *annual per capita consumption of food* at which an average

Again, according to the Poverty Assessment, 47.9 percent of Nicaraguans live below the full poverty line (30.5 percent in urban areas and 68.5 percent in rural areas).

**6.18 First, community level targeting is considered by examining the characteristics of households in the area of influence of FISE projects, the potential beneficiaries.** This gives an indication of FISE's success in reaching poor areas. Potential beneficiaries were defined differently for each FISE investment sector. For network services (such as a water or sanitation system), the potential beneficiaries were defined as all households that could be connected to the network.<sup>26</sup> For schools, access is not strictly limited by user location. However, although users from outside the community could travel to use these services, it was decided to limit potential beneficiaries to households located within the village (rural) or neighborhood (urban) where the facility was located. For health posts, norms and coverage areas defined by the Ministry of Health were applied, and all households within the district covered by a selected health post were considered potential beneficiaries. For latrines and water investments, the direct and potential beneficiaries are the same, as the investments were provided at the individual household level.

**6.19 Second, we examine the poverty levels of households that use the facilities that have received a FISE investment, the direct beneficiaries.** This analysis considers the benefit incidence of FISE investments in primary schools, health posts, latrines, water and sewerage systems.

### **Summary of Results of Community and Household-Level Targeting of FISE Investments**

**6.20** Table 6.4 presents the benefit incidence of FISE investments by per capita consumption decile to give an overview of FISE targeting by type of subproject.

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person satisfies the minimum daily requirement of 2,226 calories. A person is considered extremely poor if *all* of his/her annual expenditure is not sufficient to purchase the amount food required to achieve adequate nutrition levels.

<sup>26</sup> In the water systems in our sample, it turns out that there is no difference between potential and direct beneficiaries given the high connection rates.

Decile	Education		Health		Water	Sewerage			Latrine
	Potential	Direct	Potential	Direct		Potential	Direct – broad*	Direct – narrow**	
poorest	8.1	7.6	9.4	7.8	2.9	0.0	0.0	0.0	14.4
2	14.8	18.7	13.5	11.5	9.7	4.0	5.1	8.3	19.1
3	11.4	10.6	4.9	5.1	20.0	0.3	0.4	0.7	9.6
4	6.2	6.4	29.8	33.7	9.9	0.6	0.0	0.0	20.7
5	16.5	19.2	7.2	7.7	7.4	9.0	7.2	2.8	11.0
6	7.8	6.7	5.8	6.3	7.4	9.4	11.1	17.2	8.0
7	8.5	8.8	7.0	6.8	15.3	14.8	13.8	12.4	7.4
8	13.9	10.9	7.0	6.2	9.2	23.0	26.0	30.0	4.8
9	4.6	5.4	8.7	8.7	10.4	25.5	25.9	19.1	4.3
wealthiest	8.4	5.7	6.9	6.2	7.8	13.4	10.6	9.5	0.8
Total	100	100	100	100	100	100	100	100	100

Source: FISE Household Survey

\* Broad (FISE) definition of direct beneficiary – any access to sewerage system.

\*\* Narrow definition of direct beneficiary – flush toilet access to sewerage system.

(1) This benefit incidence table is separated into investment categories, as well as into beneficiary types. Potential beneficiaries are all those members of the community that could benefit from a FISE investment, including those that utilize the FISE facilities and those who choose not to. Direct beneficiaries are those that utilize the FISE facility (for example, a household that has received a latrine from FISE, uses the FISE health post, or whose children attend a FISE school).

**6.21 The results of the benefit incidence analysis at the community level point to high variation in FISE's ability to reach the poor, with a progressive distribution of health and education investments and a regressive distribution of sewerage investments. Education and health investments have been reasonably well targeted to potential beneficiaries: just over 40 percent of FISE education investments and 58 percent of health investments have accrued to those in the poorest 40 percent of the population. Sewerage investments are regressive with only 20 percent of investments reaching the poorest 40 percent of the population.**

**6.22 At the household level, FISE's ability to reach the poor also varies by type of subproject. Poverty targeting is excellent for latrines, good for health posts, slightly progressive for primary schools, neutral for water, and regressive for sewerage. Results show that targeting of both education and health investments was slightly more progressive at the household than the community level, reflecting the fact poorer households within the targeted communities choose to use the FISE investments. FISE latrine investments are very pro-poor, even for the poorest, with over one third of investments targeting direct beneficiaries in the poorest quintile. In contrast, FISE sewerage projects were very pro-rich, with the poorest 40 percent of the populations receiving less than ten percent of resources. Water investments were distributed evenly across the population.**

## Community and Household Level Targeting by Subproject, Using Concentration Curves

6.23 The concentration coefficients presented in Table 6.5 are the analog of Gini coefficients and range from -1 (the poorest receive all the transfers) to 1 (all transfers go to the richest)<sup>27</sup>. In Table 6.5 we also present the percent of FISE investments accruing to the extreme poor (those below the extreme poverty line) and the poor (those below the poverty line).

	Concentration coefficient /a		Percent of benefits to extreme poor		Percent of benefits to poor (including extreme poor)	
	Potential beneficiaries	Direct beneficiaries	Potential beneficiaries	Direct beneficiaries	Potential beneficiaries	Direct beneficiaries
Education	-0.061	-0.111	18.0	18.1	53.9	59.2
Health	-0.120	-0.115	17.0	12.3	64.1	65.2
Water	-	-0.004	-	12.3	-	49.9
Sewerage	-	0.420 (/b)	-	5.1 (/b)	-	-
	0.430	0.370 (/c)	4.0	8.3 (/c)	10.7	8.6
Latrines	-	-0.301	-	26.9	-	73.3

Source: Pradhan and Rawlings, 2000

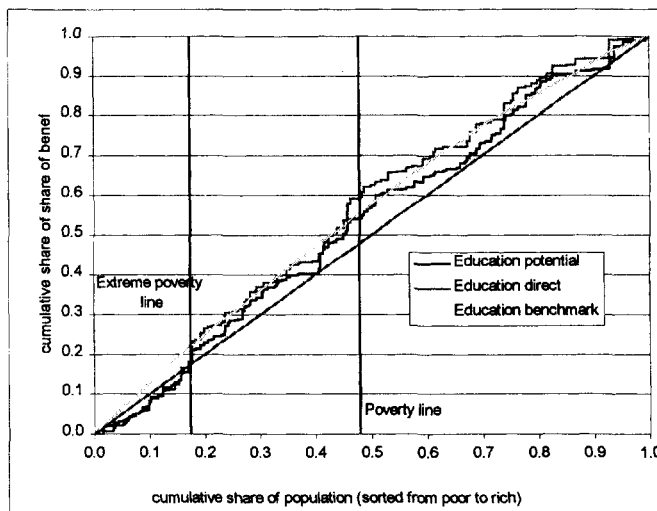
/a Concentration coefficients are the analog of Gini coefficients for concentration curves measuring the benefit incidence of investments and range from -1 (the poorest receive all benefits) to 1 (the richest receive all benefits).

/b Broad (FISE) definition of direct beneficiary – any access to sewerage system.

/c Narrow definition of direct beneficiary – flushed toilet access sewerage system.

6.24 The concentration coefficients reveal results similar to the targeting analysis by consumption decile presented in Table 6.5: FISE latrine investments reveal the most progressive targeting and sewerage the most regressive. Targeting for water is neutral, while targeting for health and education is progressive, although somewhat less so for the direct beneficiaries of education projects. Examining the share of benefits accruing to the extreme poor and poor, representing 17 percent and 48 percent of the population respectively, latrines present the best targeting outcomes and sewerage the worst. Health posts outperform education and water

**Figure 6.1: Concentration Curves for FISE Primary Education Investments**



Source: Pradhan and Rawlings, 2000

<sup>27</sup> The concentration coefficient is defined as  $1 - 2 \int G(x) dx$  where  $G(x)$  is the concentration curve.

projects with respect to favoring the poor, but primary education investments outperform health and water in terms of reaching the extreme poor.

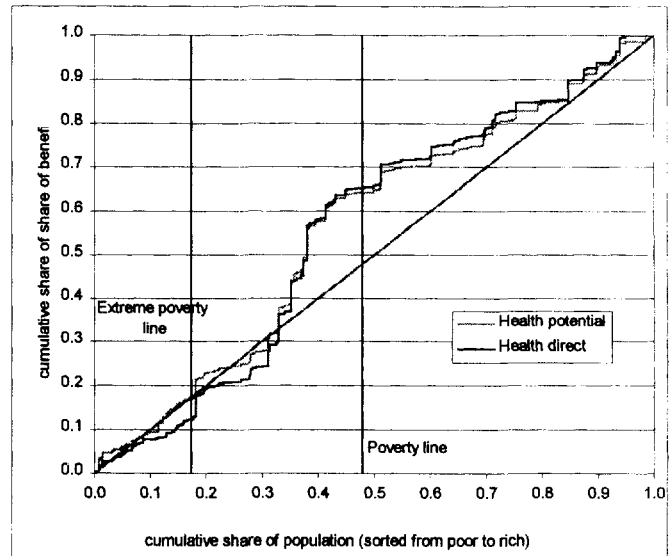
### Targeting by Type of Subproject using Concentration Curves

6.25 Concentration curves are used in Figures 6.1 to 6.5 to present targeting. Concentration curves show the cumulative percent of benefits received by the population ranked according to the welfare measure, in this case per capita consumption<sup>28</sup>. They are used to graphically present the information summarized by the concentration coefficients in Table 6.5.

### Targeting of FISE Primary School Projects

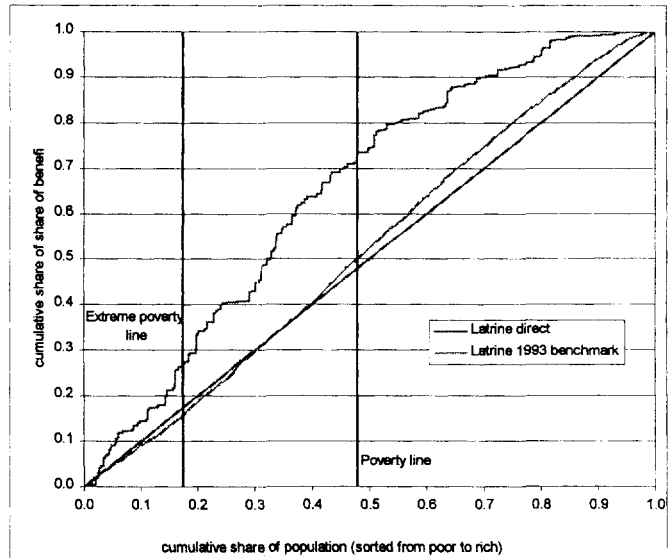
6.26 FISE primary education projects are reasonably well-targeted, but slightly regressive in reaching the poorest. For those in extreme poverty, especially for the poorest 10 percent of the population, education investments are not well targeted. However, in general education investments are distributed with a slight pro-poor bias. The pro-poor bias is a common finding when analyzing the benefit incidence of education investments and arises to a large extent from the fact that larger households generally have more children and are poorer<sup>29</sup>. For the poorest 40 percent of the population, FISE education investments are slightly progressive (the poorest 40 percent of households accessed 43.3 percent of FISE's resources). Finally, when examining only the direct beneficiary households that have a

**Figure 6.2: Concentration Curves for FISE Health Post Investments**



Source: Pradhan and Rawlings, 2000

**Figure 6.3: Concentration Curves for FISE Latrine Investments**



Source: Pradhan and Rawlings, 2000

<sup>28</sup> A major advantage of using concentration curves is that we do not need information on the average probability of benefiting. For any consumption level  $x$ , the concentration curve shows the fraction of the population with per capita consumption below  $x$  (derived from the LSMS) against the fraction of beneficiaries with per capita consumption below  $x$  (derived from the FISE beneficiaries survey). The curve can thus be computed using two independent surveys such as the LSMS and FISE Household Surveys.

<sup>29</sup> Our welfare measure, per capita consumption, does not allow for economies of scale; changing this assumption could lead to reversals in poverty rankings (Lanjouw and Ravallion 1995).

child enrolled in a FISE school, except for the population in extreme poverty, the concentration curve falls slightly above that of the potential beneficiaries indicating that the FISE schools have been relatively successful in reaching the poor children within the communities where the investments are located.

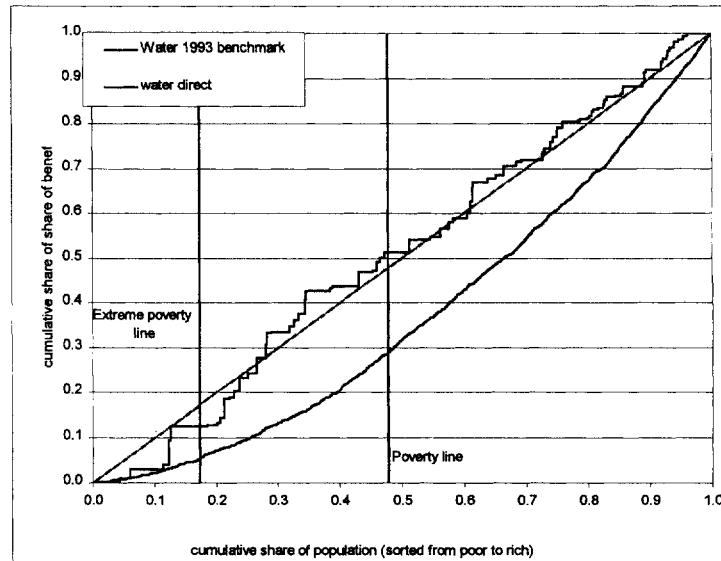
### *Targeting of FISE Health Post Projects*

**6.27 FISE health post projects are also well-targeted overall but slightly regressive in reaching the poorest.** Overall FISE health post interventions reveal a more pro-poor distribution than the education interventions. This result reflects the fact that health posts are almost always located in rural areas, as opposed to more urban health centers and hospitals that were not considered in the evaluation because they do not absorb as large a share of FISE's resources. The health interventions strongly favor the more moderate poor – 58 percent of FISE resources were allocated to the poorest 40 percent of the population (both direct users and potential beneficiaries within the community). However, only 19 percent of health resources targeted direct beneficiaries in the poorest quintile of the population, and less than eight percent reach direct beneficiaries in the poorest decile, indicating problems in reaching the poorest of the poor, particularly at the household level. Other than among the poorest, there is little difference in the targeting between potential and direct beneficiaries, indicating that the likelihood of visiting a facility, conditional upon living in an area where a FISE facility is present, does not depend on poverty levels.

### *Targeting of FISE Latrine Projects*

**6.28 FISE latrine investments are very progressive, even for the extreme poor.** FISE latrine investments are the most progressive among the five types of subprojects considered in the FISE Ex-Post Impact Evaluation, and are progressive for all poverty levels. Over one third of FISE resources spent on latrines went to the poorest 20 percent of the population, and 64 percent went to the poorest 40 percent of the population. As a benchmark we have provided the distribution of the population that used latrines in 1993, drawn from a recall question in the LSMS survey. The benchmark confirms that FISE has been successful in targeting a group much poorer than those who had access to latrines in 1993.

**Figure 6.4: Concentration Curves for FISE Water Investments**



Source: Pradhan and Rawlings, 2000

Note: There is virtually no distinction between potential and direct beneficiaries given the high household connection rates.

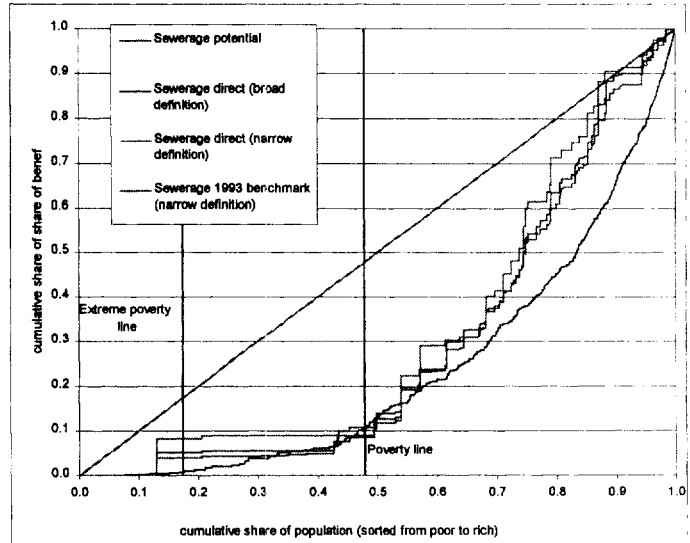
### Targeting of FISE Water Projects

6.29 Water investments are distributed quite evenly across the population, showing neither a strong pro-rich nor pro-poor bias. However, using the consumption distribution of the households with access to piped water in 1993 as a benchmark, FISE investments have gone to comparatively poorer households. But these investments are regressive with respect to favoring the poorest quintile, as only 13 percent of investments reached this group. For the poorest 40 percent of the population, the investments are slightly progressive, with 43 percent of resources allocated to this poverty category.

### Targeting of FISE Sewerage Projects

6.30 Sewerage interventions are very poorly targeted, both at the community level looking at potential beneficiaries, and at the household level looking at direct beneficiaries. Regardless of the definition of direct beneficiary, use through a flush toilet or another type of access, FISE sewerage investments are strongly regressive. In looking at the distribution of beneficiaries with access to a flush toilet, the richest 30 percent of the population received three fifths of all benefits from this type of project, whereas the poorest quintile received only eight percent and the poorest 40 percent received only nine percent of total FISE sewerage investments. In addition, compared to a benchmark of households which had a flush toilet in 1993, the FISE investments appear only slightly pro-poor.

Figure 6.5: Concentration Curves for FISE Sewerage Investments



Source: Pradhan and Rawlings, 2000

#### Box 6.1: Recent FISE Policy Initiative: Reducing Sewerage Investments

Sewerage projects have been the most poorly targeted of FISE's social infrastructure investments. This largely results from the nature of these projects: for a community to receive a sewerage system, it must already have in place a water system, which the poorest communities do not. The need to achieve economies of scale in order to maintain self-sufficient operations also prevents sewerage system construction in rural areas, which are often the poorest. Finally, connection costs and the costs of buying toilets prevent many poorer households from accessing sewerage networks.

Efforts in Nicaragua to subsidize sewerage connections to the poorest have been unable to counter the tendency of these projects to self-select less poor households. This, coupled with the sewerage targeting results from the FISE Impact Evaluation, has convinced FISE to drastically reduce investments in sewerage from 11 projects in 1999 to 4 projects in 2000, and to not finance new sewerage systems for at least two years. In an effort to continue to favor the poorest with social infrastructure projects, FISE will look to reallocate these funds to sectors that can better reach its target beneficiaries.

Source: Interviews with Carlos Lacayo and Carlos Noguera, FISE



## CONCLUSION

**6.31 FISE has successfully reached poor municipalities, communities and households, but targeting results vary widely across types of investments. FISE primary education and health post investments, where the bulk of FISE resources have been allocated, are well-targeted to poor municipalities, communities and households. However, latrine and sewerage investments reveal very different targeting patterns at the municipal level compared to the community and household level.**

**6.32 Latrine investments are clearly the most well targeted at the household level.** FISE latrine investments are very pro-poor, even for those in extreme poverty and for the poorest decile of the population. However, latrine investments are regressive on a municipal level. This suggests that latrine investments are able to 'self-target' the poor: regardless of the poverty level of the municipality, latrine investments are consistently directed to the poorest households.

**6.33 In contrast, FISE sewerage targeting is relatively neutral on a municipal level, but is the most poorly targeted type of subproject on a community and household level.** Even though FISE selects the poorest municipalities to receive the sewerage investments, this has not resulted in investments in poor communities and households. Sewerage investments are highly regressive, with 71 percent of FISE investments targeting the richest 40 percent of households.

**6.34 FISE investments need to more effectively target the very poor.** Despite most investment sectors receiving a pro-poor resource allocation, the poorest of the poor - those most in need of FISE interventions - have been neglected. FISE targeting has been neutral or regressive in all sectors except latrines for the 17 percent of Nicaraguans living in extreme poverty. The challenges increase with the severity of poverty; the poorest decile of the population have benefited from less than 10 percent of FISE's resources in all investment sectors except for latrines, where they accessed 14 percent of FISE investments. The inability to reach the poorest is a result of the poor people living in rural and sparsely populated areas in which FISE cannot achieve economies of scale through its investments as well as a result of structural issues such as the scarcity of knowledge, education and financial resources that limit these households' ability to access social investments. Reaching this poorest segment of the population remains one of FISE's largest challenges.

## 7. IMPACT EVALUATION: METHODOLOGY AND RESULTS

7.1 **The FISE Impact Evaluation seeks to answer the question “had the FISE not existed, what would have been the conditions of the facilities and beneficiaries in the FISE communities?”.** The evaluation addresses this question by identifying comparison groups that did not benefit from a FISE intervention and contrasting the results observed in the comparison groups to those from the treatment group of FISE facilities and beneficiaries.

7.2 **This impact evaluation suffers from two limitations:** (i) FISE’s demand driven resource allocation process limited our ability to use an experimental evaluation design, and (ii) no baseline data were collected prior to deciding to conduct the evaluation. Whenever possible, however, administrative data were used as a proxy for baseline data to measure differences over time. The evaluation served to construct household survey-based impact estimates as well as project survey-based estimates and qualitative community-based assessments to examine the impact of FISE investments.

### MATCHED COMPARISON EVALUATION DESIGN

7.3 **The FISE Impact Evaluation uses a ‘matched comparison’ evaluation design to assess the impact of FISE.** This type of design uses a comparison group “judged to be comparable to the participant group in important dimensions, but does not receive program services” to assess program impact (Grossman 1994).

7.4 **Within the ‘matched comparison’ framework, the FISE Evaluation applies two types of ‘matching’ between the FISE treatment group and the non-FISE comparison group to lend robustness to the impact estimates.** The first type, the “FISE Comparison Group”, was constructed using a sample of households corresponding to the closest non-FISE facilities similar to the FISE schools and health posts from which the treatment group household sample was taken. In both the FISE beneficiary and non-FISE household samples, households which were direct beneficiaries (ie. users of the investment) and households which were not direct beneficiaries (ie. not users of the investment and only part of the overall group of potential beneficiaries that *could* benefit from the investment) were selected, allowing for an assessment of targeting and impact on both the household (direct beneficiary) and community (potential beneficiary) level. The second, the ‘Propensity Comparison Group’, was taken from households that matched the FISE treatment households using a propensity score matching technique. The propensity score weights the probability that an individual receives a FISE intervention based on pre-intervention characteristics and then compares the treatment group to individuals that have similar propensity scores, but did not receive a FISE investment (please see Annex A for details on the evaluation methodology).

7.5 **This section examines the impact of FISE investments in social infrastructure (primary schools, health posts, water and sewerage systems and latrines) on beneficiaries’ health and education status.** For health and education investments, results are presented from both the ‘Propensity Comparison Group’ and the ‘FISE Comparison Group’ following the methodologies described above in Annex A. For all five types of FISE investments, we examine a variety of impact indicators, from shorter-term indicators related to access and utilization to longer term health and education outcome indicators.<sup>30</sup>

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<sup>30</sup> Nicaragua is in the process of developing a national testing system, which limited our ability to examine the impact of FISE primary school investments on educational achievement.

## HOUSEHOLD IMPACT OF EDUCATION PROJECTS

7.6 The average impact estimates for FISE primary education projects are presented in Table 7.1 regarding estimates of the impact of living in an area of influence of a FISE school on enrollment, the education gap, age for grade, repetition, attendance and age in first grade.

7.7 The two comparison groups in education give fairly consistent results regarding the significant, positive impact of FISE primary education investments on net enrollment, the education gap, and age in first grade. The consistency provided by the two methods suggest that the results are robust.<sup>31</sup>

Table 7.1: Impact of FISE Education Investments								
Impact of living in area of influence of FISE school	Treatment group		FISE Control Group		t-test on means	Propensity Control Group		t-test on means
	# of observations	mean	# of observations	mean	p value	# of observations	Mean	p value
Net enrollment rate (%)	341	91.7	358	87.2*	0.056	341	82.1*	0.0002
education gap (nr of years)	338	1.5	357	1.7*	0.039	335	1.9*	0.0001
in correct grade for age (%)	341	26.0	358	25.5	0.889	341	21.8	0.208
repetition (%) /a	302	7.3	313	10.9	0.118	259	19.0*	0.0001
days not assisted classes last month /a	302	6.8	313	7.3	0.394	259	1.7*	0.000
Age in first grade	76	7.94	85	8.60*	0.001	77	8.56*	0.004

Source: FISE Household Survey

/a Calculated conditional on observed enrollment.

\*Differences between treatment and control group are significant at the 10% level.

7.8 **Enrollment has increased as a result of the FISE investments.** The effect is large, almost 10 percent, and significant for the Propensity Comparison Group while it is small, just over two percent, but still significant for the FISE Comparison Group. These results are also confirmed by the school-based enrollment increases observed in the FISE Facilities Survey. Finally, FISE's impact compares favorably to national net enrollment rates provided by the LSMS and cited in the Poverty Assessment which remain under 90 percent even for the non-poor.<sup>32</sup>

<sup>31</sup>To confirm the similarities between the FISE Control Group and Propensity Control Group, we plotted the propensity score functions for both control groups and detected remarkably similar curvature of the two functions, suggesting that both methods provide similar, correct estimations (Pradhan and Rawlings 2000).

<sup>32</sup>The higher enrollment rates observed in FISE areas may be attributable to the sampling design applied in the evaluation where households were selected from schools' area of influence.

7.9 Both comparison groups confirm FISE's impact in reducing the education gap from approximately 1.8 years to 1.5 years.<sup>33</sup> The effect is significant for both comparison groups. No significant effects are found for the "in correct grade for age" variable.

7.10 The age at which children enter into primary school has significantly dropped from 8.6 years old to 7.9 years old due to the FISE investment, a result confirmed by both comparison groups.

7.11 Absenteeism in FISE schools is high, an average of 6.8 days per month. This is slightly better than the absenteeism observed in the FISE Comparison Group but significantly worse than that observed in the Propensity Comparison Group, rendering the results inconclusive.

7.12 As a result of the FISE investment the primary school repetition rate fell from 11 percent or 19 percent to seven percent, depending on which comparison group is used. This result is significant for the comparison with the Propensity Comparison Group, but not for the FISE Comparison Group. The results compare quite favorably with the national repetition rates cited in the Poverty Assessment which reports a primary school repetition rate of 15 percent for the extreme poor, 14 percent for the poor and nine percent for the non-poor, although the sampling approach applied for the FISE Household Survey may affect the comparability of these estimates (see Annex B for details on sampling).

**Box 7.1: Increased Enrollment: Crowding-out or Higher Overall Enrollment Rates?**

FISE's increased enrollment relative to non-FISE schools begs an obvious question: Are more children going to school as a result of FISE interventions, or are current students simply switching from non-FISE schools to FISE schools?

Through interviews with FISE officials, it seems likely that both occurred. FISE staff concur that as a result of better staffing and facilities at FISE schools, children who were not previously in school before are attracted to the new circumstances and decide to return.

However, FISE officials also suggest that in urban areas, when a local public school is in poor condition, parents will often pay to send their children to the closest private school. But after a FISE intervention improves the local public school, parents will switch their children back to the that school, saving both the tuition and transportation costs of sending their children to the private school.

Source: Interviews with FISE management, March, 2000

7.13 Table 7.2 presents impact estimates of FISE primary education investments by consumption quintile and gender. Both comparison groups confirm that: (i) the impact of FISE education investments on enrollment is higher for girls; (ii) the education gap is reduced more for children from the poorer quintiles; and (iii) that age at first grade is reduced slightly more for boys than for girls.

<sup>33</sup> The education gap measures the difference between (i) ideal educational attainment (as measured in years of education) considering the child's age and (ii) the highest grade ever attended.

Table 7.2: Impact of Education Investments by Consumption Quintile and Gender								
Impact of Living in Area of Influence of FISE School		Poverty quintile/a					Gender	
		1 (poor)	2	3	4	5 (rich)	male	female
Net enrollment (%)	FISE	82.8	96.1	96.4	94.7	90.2	90.0	93.9
	FISE Comparison Group	85.9	86.9*	97.9	82.0*	84.6	87.1	87.4*
	Propensity Comparison Group	69.2*	93.3	85.1*	73.9*	89.1	82.4*	81.7*
Education gap (# of years)	FISE	1.8	1.4	1.7	1.3	0.6	1.6	1.3
	FISE Comparison Group	2.2*	2.0*	1.5	1.5	0.7	2.1*	1.3
	Propensity Comparison Group	2.6*	2.0*	1.8	1.7	0.6	2.1*	1.7*
In correct grade for age (%)	FISE	16.8	23.6	25.4	24.8	55.3	21.8	31.5
	FISE Comparison Group	12.4	19.5	36.7	27.0	48.2	22.9	28.2
	Propensity Comparison Group	4.5*	9.1*	21.2	43.1	66.4	17.1	27.9
Age in first Grade	FISE	8.1	7.7	8.0	7.3	8.9	8.1	7.8
	FISE Comparison Group	9.1	7.8	8.3	7.8	8.0	8.9	8.2
	Propensity Comparison Group	8.7	8.0	7.1	9.8	11.0	8.7	8.3

Source: FISE Household Survey, 1998 LSMS Household Survey

/a Based on the national distribution of per capita consumption as observed in the LSMS.

\*Differences between treatment and comparison group are significant at the 10% level.

### HOUSEHOLD IMPACT OF HEALTH POST PROJECTS

7.14 **The impact of FISE health interventions on beneficiary households is generally unclear, with a probable impact on utilization rates for children under six with diarrhea and no measured impact on health outcomes.** Both comparison groups confirm a significant rise in the use of FISE health posts to attend to children under six when they have diarrhea, although the sample sizes upon which these estimates are based are small. These findings are supported by the significant rise in the utilization of health posts for children under six for all reasons and for the general population suggested by the Propensity Comparison Group, but these two impacts on utilization are not confirmed by the FISE Comparison Group. Looking beyond utilization rates, for none of the morbidity outcomes do both comparison groups point to the same significant impact of FISE health post interventions. In several cases even the direction of the impact is unclear. For example, the Propensity Comparison Group points, surprisingly, towards significantly higher incidence of respiratory infections than the FISE Treatment Group, but the FISE Comparison Group confirms neither the direction nor significance of the impact. We cannot therefore point to any measured impact of FISE investments in health posts on health outcomes other than a probable impact on utilization rates for treating infants with diarrhea.

Impact of living in Area of Influence of FISE Health Post	Treatment Group		FISE Comparison Group			Propensity Comparison Group		
	# of observations	mean	# of observations	mean	P value for equal means	# of observations	mean	p value for equal means
Contact rate (%)	1169	10.3	1196	11.1	0.523	1169	5.6*	0.000
Contact rate children <6 (%)	223	23.4	207	19.4	0.315	223	5.6*	0.000
Contact rate all > 5 (%)	946	7.2	948	9.6*	0.053	946	5.7	0.1771
Contact rate for children <6 with diarrhea (%)	50	43.3	40	18.1*	0.009	47	10.0*	0.000
Diarrhea (%)	220	27.0	207	22.6	0.286	220	18.0*	0.024
Respiratory infection (%)	1169	22.5	1196	23.5	0.562	1169	19.2*	0.046
Pre-natal care (%)	104	76.1	107	69.3	0.271	104	87.4*	0.034
Institutional births (%)	104	69.0	107	55.0*	0.036	104	70.8	0.781
Attended births (%)	104	97.7	107	94.5	0.236	104	94.9	0.302
DPT vaccine coverage (%)	36	86.7	25	94.2	0.320	36	96.3	0.147
Polio vaccine coverage (%)	36	93.6	25	97.3	0.491	36	99.8	0.150
Wasting (weight-for-height) /a (%)	164	0.4	144	4.7*	0.020	164	1.2	0.444
Stunting (height-for-age) /a (%)	164	20.5	144	24.4	0.436	164	17.3	0.466
Underweight (weight-for-age)/a (%)	164	10.1	144	19.5*	0.021	164	11.4	0.707

Source: FISE Household Survey

Source: Authors calculations based on 1999 LSMS, FISE survey and FISE administrative data.

/a Moderate malnutrition with z scores less than -2 for children below six.

\*Differences between treatment and comparison group are significant at the 10% level.

### HOUSEHOLD IMPACT OF WATER PROJECTS

7.15 **Results indicate a significant, positive impact of FISE investments on water supply and stunting in children under 6.** Impact estimates for FISE water project investments are presented in Table 7.4. The variables measuring change in infrastructure are constructed using recall information from 1993, a period prior to the FISE investments, and are used to generate difference in difference estimators. As a results of FISE investments, about one fourth more households have access to piped water in areas where FISE invested. In addition, distance to the nearest water source has been reduced by 600 meters as a result of the FISE investment. The FISE water investments have had a significant, positive impact on stunting (height-for-age) in children under 6 reducing the incidence of stunting from 25 percent in the Propensity Comparison Group to 14 percent in the FISE Treatment Group. The other malnutrition and diarrhea variables all indicate an improvement in health status, but the results are not significant. Nonetheless, the direction of these other malnutrition results provide the only support for the significant impact found for stunting in the absence of more reliable supporting evidence such as a separate comparison group or recall data serving as a baseline.

	Treatment group		Propensity control group		P value for equal means
	# of observations	Mean	# of observations	mean	
Diarrhea (% in last month – for children aged below 6)	79	18.8	157	21.1	0.676
Wasting (weight-for-height) /a (%)	102	3.4	114	7.1	0.233
Stunting (height-for-age) /a (%)	102	13.6	114	24.9*	0.034
Underweight (weight-for-age)/a (%)	102	15.6	114	21.1	0.298
Distance to water source in 1997 (km)	95	0.009	189	0.066*	0.004
Change in distance to water source between 1993 and 1997 (km)	95	0.130	189	-0.050	0.118
Piped water in 1998 (%)	95	84.6	189	58.0*	0.000
Piped water in 1998-piped water in 1993 (%)	95	27.3	189	5.9*	0.000

Source: FISE Household Survey

/a Moderate malnutrition with z scores less than -2 for children below six.

\*Differences between treatment and control group are significant at the 10% level.

### HOUSEHOLD IMPACT OF SEWERAGE PROJECTS

7.16 **FISE had a significant, positive impact on access to sewerage systems**, as illustrated in Table 7.5. Making use of recall questions regarding households' access to water and sanitation facilities in 1993, the Propensity Comparison Group is constructed from the eligible population which is defined as households which did not have a flush toilet in 1993.<sup>34</sup> From 1993 to 1998, access flush toilets increased by only 8.7 percent in the Propensity Comparison Group, while at the same time increasing by 100 percent among direct FISE beneficiary households (those that did connect to the FISE-financed sewerage system with a flush toilet), leading to a net increase in access of 91.3 percent, as illustrated in Table 7.5. When matching potential FISE beneficiary households (all those that *could* have connected to the FISE-financed sewerage system) to similar households, the analysis reveals a 34.4 percent increase in households with a toilet from 1993 to 1998 in the FISE Treatment Group, compared to only a 2.5 percent increase in the Propensity Comparison Group, leading to a net increase in access to flushed toilets of almost 32 percent as a result of FISE interventions. In looking at the impact of FISE sewerage investments on health outcomes, we examine the impact in households that have obtained a flush toilet (the impact on direct beneficiaries, as reported in Table 7.5). None of the health related impact variables is significant, but the measurement of results may be constrained by the sample size which was itself limited by the low connection rates.<sup>35</sup>

<sup>34</sup> The results presented in Table 7.5 are based on a Propensity Comparison Group that was constructed based on similarities to households directly benefiting from FISE sewerage investments through a flush toilet connection.

<sup>35</sup> When potential FISE beneficiaries (all those that could have connected to the sewerage system) are matched to their corresponding Propensity Comparison Group, we observe a significant impact of FISE-financed sewerage investments on the incidence of diarrhea in children under 6. This suggests that there may be a community-level effect sewerage interventions, even in the absence of high connection rates to the sewerage system. The larger sample size obtained when matching potential beneficiaries (as opposed to direct beneficiaries with toilets) also underscores the importance of the sample size in conducting estimates of the impact of sewerage investments on health outcomes, particularly for a specific population such as children under 6.

Impact of Receiving a FISE Sewerage Investment and Acquiring a Flush Toilet	Treatment group – potential beneficiaries		Propensity control group		P value for equal means
	# of observations	Mean	# of observations	Mean	
<b>Impact on direct beneficiary /a</b>					
Diarrhea (% in last month - for children aged below 6)	23	9.4	45	21.9	0.159
Wasting (weight-for-height) /b		0		0	n.a.
Stunting (height-for-age) /b	31	12.2	30	16.9	0.6167
Underweight (weight-for-age)/b	31	16.0	30	6.9	0.2692
Flushed toilet in 1998	31	100.0	61	8.7*	0.000
Perc. Point change in households with flushed toilet from 1993 to 1998	31	100.0	61	8.7*	0.000

Source: FISE Household Survey

/a We used the narrow definition where a household is classified as a direct beneficiary if it did not have a flush toilet in 1993 and had one in 1998 as a result of the FISE investment.

/b Moderate malnutrition with z scores less than -2 for children below six.

\*Differences between treatment and control group are significant at the 10% level.

### HOUSEHOLD IMPACT OF LATRINE PROJECTS

7.17 FISE latrine investments have generated a net increase in access to sanitation facilities of close to 20 percent in the areas they have invested, above and beyond the change that would have occurred without the FISE investment. Again, household recall questions from 1993 were used. However, no significant results were found for the impact on diarrhea or malnutrition as a result of FISE latrine investments. Impact estimates for latrine projects are presented in Table 7.6.

	Treatment group – potential beneficiaries		Propensity Comparison group		P value for Equal means
	# of observations	Mean	# of observations	Mean	
Diarrhea (% in last month - for children aged below 6)	226	29.16	451	24.52	0.204
Wasting (weight-for-height) /a (%)	315	5.8	320	5.8	0.9632
Stunting (height-for-age) /a (%)	315	23.6	320	24.3	0.8555
Underweight (weight-for-age)/a (%)	315	12.7	320	14.7	0.4719
No latrine in 1998 (%)	224	1.86	447	23.00*	0.000
Percent point change in households without toilet from 1993 to 1998	224	-31.87	447	-13.19*	0.000

Source: FISE Household Survey

a/ Moderate malnutrition with z scores less than -2 for children below six.

\* Differences between treatment and comparison groups are significant at the 10% level.



## CONCLUSION

7.18 **FISE primary school investments have had a positive impact on enrollment, the education gap and age in first grade**, although the amount and significance of the results depend on which control group is used. The robustness of these results is confirmed by the triangulation provided by the use of two types of evaluation methodologies

7.19 **For FISE health post investments the results are less clear, although the results point to a probable impact on utilization rates for children under six with diarrhea.** Looking beyond utilization rates, for none of the morbidity outcomes do both comparison groups point to the same significant impact of FISE health post interventions. In several cases even direction of the impact is unclear. For example, the Propensity Comparison Group points, surprisingly, towards significantly higher incidence of respiratory infections than the FISE Treatment Group, but the FISE Comparison Group confirms neither the direction nor significance of the impact. We cannot therefore point to any measured impact of FISE investments in health posts other than a probable impact on utilization rates for treating infants with diarrhea.

7.20 **FISE water, sewerage and latrine investments result in significant increases in coverage, but not in health outcomes for direct beneficiaries except for the probable positive impact of water investments on stunting in children under six.** For the water and sanitation investments we can confirm the improvements in infrastructure from the household survey using recall questions to construct difference in difference estimates. The health related variables for sanitation investments point towards a positive effect but are generally insignificant, probably as a result of the small sample sizes used in the case of sewerage investments.

### Box 7.2: Should FISE Promote Health and Nutrition Outreach Programs?

Changing health outcomes is a complex endeavor that is contingent on many household-level factors, including income and education levels, hygiene practices, health outreach, and access to skilled birth attendants. Given the lack of improvements in health and nutrition outcomes as a result of FISE investments, it is clear that infrastructure interventions alone are not sufficient to achieve desired health outcomes.

Health promotion campaigns are one of the most cost-effective and rapid means to improve health and nutrition status. According to the 1993 World Development Report, outreach programs are extremely effective in influencing household behavior regarding diet, proper treatment for childhood illnesses, and family planning, and can result in diminished malnutrition and infant mortality rates. Successful examples of outreach programs are numerous: in Bangladesh, a family planning campaign led to a 10 percent increase in condom prevalence in one year; in Indonesia, a nutrition campaign led to an improved nutritional status in 40 percent of children; and in Egypt, an oral rehydration therapy (ORT) promotion program led to a 68 percent increase in the use of ORT in one year, and a 30 percent decline in infant mortality in children less than one year old.

Results from the Nicaragua Poverty Assessment suggest a need for public health and prevention campaigns in order to aid households to better care for their own health.

Given the cost-effectiveness of outreach programs and the recommendations of the Nicaragua Poverty Assessment, FISE should consider complementing its infrastructure investments with promotional campaigns that encourage changes in household behavior in order to improve health outcomes.

Sources: Nicaragua Poverty Assessment 2000, World Development Report 1993, Information, Education, and Communication: Guidelines for Health, Nutrition and Family Planning Programs

## 8. COMMUNITY PRIORITY AND PARTICIPATION

8.1 **This section uses the 1998 Qualitative Beneficiary Assessment to examine whether FISE-financed projects were community priorities, whether communities were involved in project design and implementation, and communities' perceived impact of FISE projects.** Community participation is a critical element of social fund operations. By targeting communities with priority projects and by encouraging participation in the project itself, social funds promote sustainability since the community is more apt to utilize its own resources to maintain the FISE investment over the long-term. We review the results of focus group sessions and accompanying interviews conducted in the 22 communities selected as a sub-sample for the Qualitative Beneficiary Assessment.

8.2 **Most participants were satisfied with FISE.** The majority of interviewees (82 percent) who participated in the implementation of a FISE project deemed the experience to be satisfactory or extremely satisfactory. The participation of the local government was deemed good or satisfactory by less than one third of interviewees, and almost two thirds deemed the community's participation to be sufficient.

### CHOICE OF PROJECT

8.3 **In the Qualitative Beneficiary Assessment, it was difficult to measure whether FISE projects met the previously established priorities of a particular community,** as the evaluation was carried out after the completion of FISE projects and the majority of the communities did not have a formal development plan or list of investment priorities on record comparing the FISE investment relative to other potential investments. With this in mind, the Qualitative Beneficiary Assessment attempted to infer communities' prioritization of the FISE projects received by comparing the perceived benefits derived from FISE projects with those from non-FISE projects in the sampled communities. The rationale was that if the FISE project was the community's highest priority project, then the community members would name it as the most beneficial of all the projects the community had received. In the absence of baseline data, benefits would provide the next best estimate of priorities.

8.4 **FISE projects were consistently deemed to be the most beneficial one received by the community.** 71 percent of interviewees believed that the FISE projects were the most beneficial, and only seven percent of interviewees concluded that the benefits of the FISE project were equal to or less than those of other projects. There was no significant difference in the answers between communities with different poverty levels or urban/rural locations. Nevertheless, respondents did not believe that the FISE sewerage systems were as high of a community priority as other FISE projects, with only 57 percent of the interviewees claiming them to be the most beneficial project the community had received.

8.5 **Results suggest that FISE is able to effectively identify community priorities during their pre-investment consultation with community stakeholders.** Nonetheless, it would be advisable to produce records of formal community consultations regarding priorities as part of the data generated from the new microplanning process. These data could be included as project-level baseline data for future evaluations.

## GOVERNMENT PARTICIPATION

8.6 The participation of both central and local government representatives in FISE projects was examined in the Qualitative Beneficiary Assessment.

8.7 Overall, participants claimed that local government officials were not as involved as they should have been in the development of the FISE projects. The majority of interviewees in the Qualitative Beneficiary Assessment suggested that local government officials participated in identifying community needs and 42 percent suggested that the local government was involved with management of the FISE project. However, 70 percent of participants believed that the local government officials did not participate enough in establishing community priorities, approving projects, coordinating with line ministries, supervising the project implementation, disseminating information, and project selection. The opinions of local government officials' involvement were more positive in the poorer and more rural areas.

8.8 Participants believed that line ministry participation in FISE project maintenance was unsatisfactory. The participation of MED (the Ministry of Education) in school maintenance was ranked as good or average in only 54 percent of FISE education projects, and the participation of MINSA (the Ministry of Health) in health post maintenance was deemed to be good or average in only two-fifths of FISE health projects. Contractors, ex-workers and users were most critical of MINSA's and MED's participation levels.

8.9 In terms of project supervision, the participation of the line ministries was considered to be superficial, as the majority of responsibilities were left to FISE supervisors. These results suggest that MINSA and MED do not have the resources to supervise effectively, and that usually FISE or communities themselves are relied upon to solve problems even though the facilities officially belong to the education and health ministries.

## COMMUNITY PARTICIPATION IN FISE INVESTMENTS

8.10 The Qualitative Beneficiary Assessment asked individual interviewees whether they thought community participation in FISE projects was adequate during the various stages of project planning and implementation.

### Box 8.1: Testimonies: Community Participation

The Qualitative Beneficiary Assessment asked focus groups "If you could change one thing about the way FISE works, what would it be?" Over half of the groups responded that they would like to see the community more involved in project development.

*"They did not take us into account, and the community did not know about the health post project. We thank you again, but we really did not know about the project".* Bluff Focus Group

*"I believe that the problem was that the community was not able to participate in the project and have control over expenses, investments and suggestions."* Dinamba Focus Group

8.11 Community participation was higher in identifying FISE projects and lower in project design, construction and maintenance. The majority of those interviewed responded that participation was strong in identifying community needs (79 percent). However, respondents generally agreed that community participation was low in terms of project design (five percent), construction (31 percent) and in supervision (13 percent). Half of government officials and contractors and 55 percent of the users indicated

that the community maintains a high level of participation in project maintenance.

8.12 According to half of the focus group participants, community participation was limited to consultation regarding community needs and defining investment priorities. They stated that the community was not able to participate in making the final decision regarding project choice, and that participation in project supervision was limited.

### PERCEIVED IMPACT OF FISE PROJECTS

8.13 In focus groups, communities were asked about the impact of FISE projects. The focus group method allowed for a qualitative assessment of the benefits of these projects to the community – specifically regarding standards of living, community infrastructure and community user levels.

8.14 These results suggest a high level of satisfaction with FISE projects, particularly in rural areas. Three-fifths of interviewees reported that community living standards had improved as a result of the FISE investment. This number was higher in rural areas (71 percent) and high-poverty communities. Impacts on community infrastructure were also recognized. The vast majority (95 percent) of the interviewees perceived that many families use the FISE project, again with a more favorable perception in rural areas. In urban areas one fifth of participants suggested that few families made use of the FISE project.

#### PROJECT QUALITY AND SUSTAINABILITY

8.15 The Qualitative Beneficiary Assessment asked interviewees about the construction of their FISE facility as well as the current status of the facility.

8.16 Overall three fifths of interviewees qualified their FISE projects to be in good condition, whereas only two percent considered their projects to be in poor condition. The majority of interviewees expressed that there were defects in the construction of the FISE facilities, however most claimed that these were minor. Defects were most prevalent in school projects, and also in those projects constructed in high poverty areas. Some interviewees also suggested that facilities deteriorate too rapidly due to poor construction.

8.17 The majority of participants attributed defects in the construction of FISE facilities to the contractors. Often, the contractors did not complete the project to the standards of the community, and at times used poor construction materials or turned unfinished projects over to the community. Sewerage system construction received the most complaints from the interviewees, as the pipes were not hooked directly into the households and so the service was unusable. Interviewees showed the highest approval of education and health projects that either replaced old facilities or built new facilities altogether, and were generally satisfied with the design and presentation of these facilities. However, they frequently mentioned the need to improve the design of the health posts, referring to the current design as small and uncomfortable.

#### Box 8.2: Testimonies: Construction Complaints

*“One of the problems is that people have not installed the sewerage system to their house because of the level at which the system was built. The house above can connect to the system because it is at the right level, but the house below has still not been able to install his service. I had to make mine higher, at street level, to be able to put in the sewerage system.”*

*“FISE is not to blame here; they grant the money to complete the project. It is the constructor that does not do things well.”*

Focus Group, Somoto

Source: Qualitative Beneficiary Assessment

**8.18 Sewerage projects were criticized for not including the cost of acquiring toilets and connecting to the sewerage system.** These opinions resonate with the low connection rates reported in the FISE Facilities Survey and FISE Household Survey.

**8.19 FISE's Preventative Maintenance Fund, a recent initiative to bolster project maintenance, may facilitate carrying out necessary maintenance activities for FISE projects** (See box 8.3).

## CONCLUSION

**8.20 Evidence from the Qualitative Beneficiary Assessment suggests that satisfaction with FISE investments is high, particularly in poorer, rural areas.** Some problems in construction were pointed out, but these were mostly deemed to be minor. Whether the investments met community priorities was harder to assess ex-post, when priorities were assessed by comparing the FISE investment to others received by the community. The assessment of priorities could be improved upon by assessing community priorities ex-ante during the project identification process.

**8.21 Community participation is high in identifying priority needs during project identification, but decreases substantially during construction, operation and maintenance.** FISE needs to continue prioritizing efforts such as the new Preventative Maintenance Fund to bolster community participation in all phases of the project cycle.

**8.22 Communities called for increased communication between FISE, government officials and project beneficiaries, a process that merits monitoring as the new microplanning strategy evolves.** If the microplanning process is successful, communities should be further integrated into the project development process, translating into increasing communities' sense of ownership and local governments' participation.

### Box 8.3: The Preventative Maintenance Fund: FISE's New Tool to Support Project Sustainability

The Preventative Maintenance Fund (PMF) is a new tool introduced as part of FISE's decentralization initiative. Local stakeholders and governments can access FISE funds to co-finance the maintenance of FISE health and education infrastructure projects. The PMF funds are managed by community maintenance committees and used to repair deficiencies in the physical infrastructure of FISE projects.

Overall, 131 municipalities (89 percent of the national total) have accessed funds from the PMF. As of June 1999, PMF assistance had been approved for 767 schools and 143 health posts, more than three-fifths of all FISE investments in these sectors. 910 community maintenance committees had been created, comprising over 6,370 people. FISE expects to increase PMF coverage in coming years.

Source: Bermudez, 2000

## 9. FISE PROJECTS: IMPACT AND SUSTAINABILITY

9.1 **This section uses a case study approach to examine service provision and use in the facilities in which FISE has invested, using data from the FISE Facilities Survey.** Because FISE investments are in infrastructure and equipment, but achieving an impact on human capital formation relies on the provision of complementary inputs, we examine not only the elements of the FISE intervention, but also the availability of staffing, supplies, maintenance, and cost-recovery mechanisms that often come from line ministries, communities or NGOs and are critical to ensuring an effective and sustainable social sector investment in the targeted communities. Finally, we use the data from the FISE Facilities Survey interviews with community members to complement the information from the Qualitative Beneficiary Assessment regarding communities' participation in FISE investments.

9.2 The FISE Facilities Survey provides data from FISE and non-FISE health posts and primary schools, but only from FISE water and sewerage systems, where comparable projects were harder to identify. In the case of water and sewerage systems, the evaluation highlights features of the systems, and explains differences between projects that might account for the projects' relative success or failure.<sup>36</sup>

9.3 **Because the sample for the Ex-Post FISE Evaluation was designed to be representative at the household level only, the results in this section are examined on a case study basis and are not generalizable to the universe of FISE and non-FISE facilities.** The small sample sizes in the FISE Facilities Survey often limit our ability to derive statistically significant differences between FISE and non-FISE projects in the health and education sections. However, when present, statistically significant differences are reported.

9.4 **This section presents results from FISE health post, primary school, water and sanitation system investments with respect to:** (i) *utilization*, using 1993 pre-FISE intervention administrative data and 1997 post-FISE intervention data from schools and health posts to conduct difference-in-differences estimates, comparing utilization both before and after the FISE investment, as well as between FISE and non-FISE facilities; (ii) *operational sustainability*, comprising inputs that are necessary compliments for the FISE investments, such as personnel and medicines for health posts; (iii) *physical sustainability* to examine the nature of the FISE investment and the availability of maintenance and financing required for its sustainability; and (iv) *community participation* to complement the results of the Qualitative Beneficiary Assessment.

9.5 **We also report some communities' testimonies from the Qualitative Beneficiary Assessment to complement the results from the FISE Facilities Survey.** These testimonies are presented in text boxes throughout the section. Finally, we draw on data from interviews conducted with FISE officials to discuss the results of the impact evaluation to provide their perspective on the implications of the findings.

### SECTION 1: HEALTH POSTS

9.6 **Health posts are the main recipients of FISE investments in the health sector.** The posts are almost always located in rural areas and are the smallest, but most prevalent type of health facility in the health services network run by the Ministry of Health (MINSA) that also includes health centers and hospitals.

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<sup>36</sup> Because of their provision directly to households, the impact and sustainability of latrines is considered only in the household survey analysis.

### **Box 9.1: Summary of FISE Health Post Investments**

The FISE Facilities Survey evaluated 20 FISE and 20 non-FISE health posts to assess utilization, operational sustainability, physical sustainability and community participation.

#### ***Utilization***

- More people visit FISE health posts than non-FISE health posts, but utilization rates remain low overall.
- FISE health posts have experienced an increase in utilization since 1993, particularly by women. The seven percent growth in female participation rates in FISE health posts from 1993 to 1997 is statistically significant.

#### ***Operational Sustainability***

- *Personnel.* FISE health posts have more total staff, including volunteers (19 vs. 13), as well as more professional staff (2.6 vs. 1.7) than non-FISE health posts, although this may reflect differences in the types of facilities sampled. Staffing levels for both total staff and professional staff have increased in FISE health posts since 1993, while both have declined in non-FISE health posts. Despite these changes, staffing levels in both FISE and non-FISE health posts remain below Ministry of Health standards.
- *Medicine.* In both FISE and non-FISE health posts just under half of the medicines that should be available according to Ministry of Health standards are often not available. In non-FISE health posts 31 percent of the required medicines are *never* available, as compared to 25 percent for FISE health posts.
- *Medical supplies.* FISE health posts are better-endowed than non-FISE posts with respect to periodically replaced medical materials, equipment and required furniture, although in no case are more than 65 percent of these inputs consistently available.

#### ***Physical Sustainability***

- *Infrastructure.* All health posts lack access to basic infrastructure. FISE and non-FISE health posts have equal access to electricity (64 percent and 65 percent respectively), and under 30 percent of both FISE and non-FISE facilities have water piped into their premises during working hours.
- *Maintenance.* FISE health posts carry out key maintenance activities (specifically to electrical systems and sanitary systems) more frequently than non-FISE facilities. Maintenance funds are generally lacking, particularly in FISE facilities.
- *Financing and Cost Recovery.* The Ministry of Health (MINSA) is responsible for the majority of health post financing for medicines, periodically replaced materials and medical equipment. FISE facilities are more likely to have communities contribute funds and materials for maintenance. Non-FISE health posts are almost twice as likely to ask for voluntary contributions from users.

#### ***Community Participation***

- FISE health posts report lower participation in the project design stage than do non-FISE posts, but higher participation in the construction phase. Local participation in project supervision remains limited in both FISE and non-FISE posts. Participation by NGOs was higher for FISE posts in providing medical equipment, but non-FISE posts rely more on NGOs for medicine provision.

## Utilization

### Box 9.2: Testimony: Access to Health Posts

*"For me things have changed. Before this health post was here we had to go to Jinotega to the health post, even for little things and the children's small illnesses."*  
San Antonio de Sisle, Jinotega

Source: Qualitative Beneficiary Assessment

**9.7 Utilization of both FISE and non-FISE health posts increased significantly, with a slightly greater and significant increase observed in FISE health posts.** In 1993, the average daily number of visits to a FISE post was 11.3, compared to 8.8 for the non-FISE posts. In 1997, these numbers climbed to 17 and 14, respectively (see Table 9.1). Despite the increase in utilization, these rates remain far below the capacity of rural health posts and reflect underutilization problems in FISE and non-FISE posts alike.

**9.8 The rise in the utilization of health posts by the poor is confirmed by the World Bank's Poverty Assessment of Nicaragua.** The Poverty Assessment reports that in 1993, eight percent of health care visits by the poor were at health posts and 60 percent were at health centers. By 1998, 16 percent of visits were at health posts, and visits to health centers had been reduced to 53 percent. The same trend can be observed among the extreme poor: in 1993, only seven percent of all health care consultations by the extreme poor were at health posts, whereas 65 percent were at health centers. By 1998, however, 26 percent of health care consultations by the extreme poor were at health posts, and only 50 percent were at health centers.

**9.9 Female utilization of health posts increased significantly from 1993 to 1997, particularly in FISE health posts.** This rise in female utilization is reflected in changes in the incidence of pregnancy and postpartum services as compared to all other types of services provided. As with overall utilization, growth in female utilization rates in FISE health posts has outpaced that of non-FISE posts. As a reflection of the more frequent use of services by females, the rate of visits for pregnancy and postpartum services as a percentage of all visits increased in both FISE and non-FISE health posts (but more so in non-FISE posts). Information regarding female and overall utilization of health posts is summarized in Table 9.1.

Mean Number of Daily Visits	1993	1997	Difference
FISE	11.3	17.0	5.7*
Non-FISE	8.8	14.0	5.2
Difference in differences			0.5
<b>% of Female Daily Visits</b>			
FISE	58.5%	65.7%	7.2%*
Non-FISE	60.8%	64.6%	3.8%*
Difference in differences			3.4%
<b>% of Visits for Pregnancy and Post-partum Services</b>			
FISE	13.1%	14.7%	1.6%
Non-FISE	10.9%	13.7%	2.8%
Difference in differences			-1.2%*

Source: FISE Facilities Survey  
\*Differences between FISE and non-FISE results are significant at the 10% level.

### Operational Sustainability

**9.10** The FISE Facilities survey collected data on the availability of personnel, medicine, medical supplies, medical equipment, and furniture required by the Ministry of Health (MINSa) following the norms provided by MINSa.



### Availability of Personnel

9.11 Health posts in Nicaragua are divided into two categories according to the MINSA. Type "A" health posts are supposed to be staffed by both a doctor and a nurse, and type "B" posts by a nurse, with periodic visits by a doctor. As part of the FISE Facilities Survey, 18 type "A" health posts and 22 type "B" health posts were interviewed. Of these, 61.1 percent of the FISE and 30.5 percent of non-FISE facilities were of type "A". These difference in the sample reflect difficulties encountered in the matching exercise and influence the results regarding staffing in FISE and non-FISE health posts reported in this chapter.

	1993	1997	Difference
<b>Total Staff (1)</b>			
FISE	15.4	18.6	3.2
Non-FISE	17.2	13.1	- 4.1
Difference in Differences			↑ 7.3
<b>Professional Staff (2)</b>			
FISE	2.3	2.6	0.6
Non-FISE	1.9	1.7	- 0.2
Difference in Differences			↑ 0.8
<b>Professional Staff (3)</b>			
FISE	1.0	1.4*	0.4
Non-FISE	0.6	0.5*	- 0.1
Difference in Differences			↑ 0.5

Source: FISE Facilities Survey

(1) including volunteers; (2) including nurse's aids;  
(3) excluding nurse's aids.

\*The difference between FISE posts vs. non-FISE posts is statistically significant at the 10% level.

9.12 Overall, health posts were not staffed according to MINSA's norms. Of the 40 health posts included in the survey, 23 were run by a nurse's aid. The majority of the non-FISE posts were run by a nurse's assistant (70 percent), whereas only 39 percent of the FISE posts were in this situation. Also, in the FISE facilities sample, it is common for a post that has a doctor to not have any nurses. Finally, FISE health posts were twice as likely to employ a doctor as are non-FISE health posts. These differences may reflect differences in the sample as reported above.

9.13 Staffing in FISE health posts has increased significantly, while declining slightly in non-FISE health posts. The number of professional staff (limited to doctors, nurses, dentists and

pharmacists) in FISE posts increased by 40% from 1993 to 1997, whereas the professional staff in non-FISE health posts declined slightly. In overall staff including nurses' aides, administrators and volunteers, FISE has likewise seen a rise from 1993 to 1997 in contrast to the declining number of staff members in non-FISE health posts. According to interviews with FISE personnel conducted regarding the results of the evaluation, the better staffing at the FISE posts is due to two reasons: (i) FISE consults with MINSA to obtain their commitment to the proper staffing of the FISE health post prior to carrying out the infrastructure investment, and (ii) medical professionals are more willing to work in the better quality facilities that FISE provides. FISE and non-FISE health post staffing in 1993 and 1997 is summarized in Table 9.2.

### Access to Basic Medicines, Supplies, Equipment and Furniture

9.14 FISE and non-FISE health facilities similarly lack key medicines, replaceable medical supplies, medical equipment and furniture, although FISE health posts are in slightly better condition than their non-FISE counterparts (Table 9.3). Slightly under half of required medicines are not available on a regular basis in either FISE or non-FISE health posts. These similar results are to be expected, as MINSA is responsible for providing medicine to all health posts in Nicaragua. However, FISE posts report better availability of replaceable medical supplies (such as cotton absorbents, thermometers, and urine collectors) and equipment (such as scales, measuring tape, refrigerators, crutches and wheelchairs), items traditionally provided by MINSA. Although MINSA does not always follow-

through with its commitment to adequately supply the health posts in which FISE invests, FISE staff believe that FISE's practice of obtaining such a commitment from MINSA prior to carrying out a health post investment is responsible for the comparatively better conditions observed in the FISE health posts regarding the availability of medical supplies and equipment.

	% Consistently Available <sup>37</sup>	% Never Available
<b>Medicine</b>		
FISE	55.4	24.6
Non-FISE	56.0	31.5
<b>Medical Supplies</b>		
FISE	59.3*	35.6*
Non-FISE	41.7*	49.3*
<b>Medical Equipment</b>		
FISE	64.6	-
Non-FISE	59.6	-
<b>Furniture</b>		
FISE	64.8*	-
Non-FISE	52.5*	-

Source: FISE Facilities Survey

\*The difference between FISE and non-FISE health posts is statistically significant at the 1% level.

**9.15 FISE health posts have better access to furniture than non-FISE health posts.** The FISE Facilities Survey determined the availability and status of 18 key pieces of furniture as specified by MINSA norms. 65 percent of FISE health posts reported having access to this furniture in good condition, whereas 53 percent of non-FISE posts reported having similar access. This is likely due to the fact that FISE is largely responsible for providing the furniture in FISE health posts, whereas MINSA is primarily responsible for supplying key medicine, medical supplies and equipment for FISE and non-FISE health posts. Information regarding the availability of medicine, medical supplies, medical equipment and furniture is summarized in Table 9.3.

## Physical Sustainability

### *Infrastructure*

**9.16 Basic infrastructure is lacking in both FISE and non-FISE health posts.** Less than half of the sampled health posts reported having piped water available as part of health post installations. Furthermore, only 26 percent of FISE health posts reported having access to piped water during work hours, compared to 29 percent of non-FISE posts. However, most health posts (86 percent) have access to safe water, with FISE posts having slightly greater access.<sup>38</sup> 65 percent of FISE and 64 percent of non-FISE health posts reported having access to electricity. However, the lack of electricity in FISE health

<sup>37</sup> For medicines and medical supplies material, consistent availability is defined as "available always", "available majority of the time", and "medical equivalent is available"; for equipment and furniture, availability is defined as available and in functional condition.

<sup>38</sup> Safe water is defined as piped water inside or outside the facility, private or public well water, or water from a standpipe.

posts is more attributable to the community lacking electricity than it is in non-FISE health posts, as a much higher percentage of the communities with non-FISE health posts have access to electricity. This information is summarized below in Table 9.4.

<b>TABLE 9.4: Health Post Access to Basic Infrastructure</b>	<b>FISE</b>	<b>Non-FISE</b>
Piped water available as part of the infrastructure	48%	48%
Piped water available during hours of service	26%	30%
Access to safe water <sup>39</sup>	91%	83%
Average number of bathrooms <sup>40</sup>	2.2	1.9
Average number of flush toilets	1.0	1.0
Percentage of bathrooms in regular or better condition	64%	63%
Electricity available during hours of service	65%	64%
Electricity in community	74%	92%
Telephone in health post	4%	0%
Rain drainage facility	4%	4%
Source: FISE Facilities Survey		

None of the differences are statistically significant.

9.17 **FISE health posts are in better shape than non-FISE health posts with respect to their infrastructure and physical conditions.** Correspondingly, non-FISE post are in more need of repairs than the FISE facilities, indicating decay of their physical infrastructure. For example, 53 percent of non-FISE posts reported needing roof repairs, whereas only 15 percent of the FISE posts reported this need and 70 percent of non-FISE posts reported having rusty metals compared to only 21 percent of the FISE facilities.

### *Maintenance*

9.18 **FISE health posts perform better than their non-FISE counterparts in terms of preventative maintenance.** Two preventative maintenance activities are deemed particularly important in health posts: electrical systems and sanitary systems. In both of these areas, among posts with these installations, a greater percentage of the FISE facilities reported carrying out preventative maintenance activities than did their non-FISE counterparts (43 percent to 20 percent in electrical systems and 72 percent to 54 percent in sanitary systems).

9.19 **FISE health posts also report greater attention to general maintenance.** Of all the posts surveyed, the ones that had received repairs to the metal and iron work were all FISE health posts (one fourth of the FISE health posts). The most commonly cited reason for a lack of repairs in both FISE and non-FISE health posts was unavailability of funds.

9.20 **Maintenance funds are lacking, particularly in FISE health posts.** Of the 40 health posts in the FISE Facilities Survey sample, four non-FISE posts reported having access to a maintenance fund compared to two FISE posts. Although the differences are small, this evidence supports the idea that FISE operations are more sustainable, despite the lack of funds to carry out maintenance, as they have generally outperformed non-FISE posts in terms of performing needed repairs and preventative maintenance.

<sup>39</sup> Refer to footnote 37.

<sup>40</sup> Includes latrines and flush toilets.

9.21 Since the fielding of the FISE Facilities Survey, FISE has introduced a Preventative Maintenance Fund in many communities to address some of the maintenance concerns, as reported in Chapter 8.

*Financing and cost recovery*

9.22 In all posts, MINSA provides the majority of financing for medicines, periodically replaced medical supplies, and medical equipment. However, it appears that non-FISE health posts receive a greater percentage of the financing for material inputs from MINSA, whereas FISE posts benefit from a greater percentage of furniture provision by FISE as well as a larger portion of financing by NGOs of key medical equipment. This information is summarized in Table 9.5.

<b>TABLE 9.5: Provision of Material Inputs (percent)</b>	<b>FISE</b>	<b>Non-FISE</b>
MINSA provides medicines	100	100
MINSA provides periodically replaced materials	93	97
MINSA provides medical equipment	81	85
An NGO provides medical equipment	13	6
MINSA provides furniture*	55*	77*
FISE provides furniture	38	10
Source: FISE Facilities Survey		

\* Difference is statistically significant at the 5% level.

9.23 MINSA is responsible for the operation of the majority of health posts. Four fifths are run solely by MINSA, and the rest are run jointly by MINSA and either the community, an NGO or a church. In all cases MINSA is reported to be the primary institution in charge of operating the health post. However, in regard to responsibility for allocating funds and materials and labor for the maintenance of health posts, non-FISE facilities are almost twice as likely to consider MINSA to be the sole provider. More likely than not, the FISE facilities report the community as a major, but not the principal, player in the provision of financial and in-kind resources.

9.24 Non-FISE health posts are almost twice as likely to ask for voluntary contributions from users. Of the 40 health posts surveyed in the Facilities Survey, only one (a FISE post) charges mandatory user fees. All the other posts charge a voluntary fee (63 percent) or provide services for free. Almost twice as many non-FISE facilities ask for voluntary contributions compared to FISE facilities. The majority of FISE posts provide their services for free. Table 9.6 summarizes results from the FISE Facilities Survey regarding health post financing and cost recovery.

<b>TABLE 9.6: Health Post Financing (percent)</b>	<b>FISE</b>	<b>Non-FISE</b>
% with a maintenance fund	13	17
% where MINSA is solely responsible for the allocation of maintenance funds	39*	74*
% of facilities that charge voluntary user fee	39*	75*
% of facilities with poor infrastructure	30*	75*
Source: FISE Facilities Survey		

\* Difference is statistically significant at the 5% level.

## Community Participation

9.25 Although FISE projects were not matched specifically to projects carried out by other institutions for the purpose of the FISE Facilities Survey, both FISE and non-FISE communities were asked about their involvement in the formulation, construction and supervision of their health post.

9.26 Other than labor contributions, community participation is lower in FISE health post infrastructure projects. Communities were less apt to be consulted regarding the design of FISE health posts than they were regarding non-FISE counterparts. On the other hand, communities were more involved in supplying labor to FISE projects than to non-FISE projects. Results are summarized below in Table 9.7.

<b>TABLE 9.7: Community Participation in FISE Health Post Investments* (percent)</b>	<b>FISE</b>	<b>Non-FISE</b>
Community Consulted in Design of Project	47	74
Volunteer Knowledgeable about which Agency Designed the Technical Aspects of the Project	52	62
Community Contributed Labor in Construction	38	24
Source: FISE Facilities Survey		

\*None of the differences are statistically significant.

## Conclusion

9.27 The overall picture presented by the data from both FISE and non-FISE health posts is bleak. The data from the FISE Facilities Survey reveal that FISE and non-FISE health posts alike suffer from understaffing, poor access to running water and electricity, and a lack of basic medicines and supplies. For the most part, MINSA supplies key inputs when these are available, and the role of other organizations is limited. The agreement that FISE obtains from MINSA regarding commitments for proper staffing and supplies are not being met, as is reflected in the norms observed at FISE health posts.

9.28 Nonetheless, FISE health posts outperform non-FISE health posts in terms of professional staffing, total staffing, access to medical supplies and furniture, and maintenance. However, staffing differences between FISE and non-FISE posts may reflect the characteristics of the sample.

9.29 Both FISE and non-FISE health posts have experienced increased utilization in the period 1993 to 1997, a result clearly confirmed by the Poverty Assessment. FISE health posts have experienced larger increases over time in utilization and female utilization. FISE facilities also are better maintained than the comparators, and are less dependent on MINSA and more likely to benefit from NGO and the community for continued maintenance.

## SECTION 2. PRIMARY SCHOOLS

9.30 The majority of FISE education investments are in primary schools in rural areas, as reflected in the random sample of FISE primary school projects selected for the FISE Impact Evaluation. Both the FISE and non-FISE schools in our sample are public schools run by the Ministry of Education (MED).

### Box 9.3: Summary of FISE Primary School Investments

The FISE Facilities Survey evaluated 24 FISE and 24 non-FISE primary schools to assess school utilization, operational sustainability, physical sustainability and community participation.

#### *Utilization*

- Enrollment has significantly increased by one fifth in FISE primary schools, and has slightly declined in non-FISE primary schools.

#### *Operational Sustainability*

- *Personnel.* The number of teachers and total staff in both FISE and non-FISE schools increased, but the increase was greater for FISE schools.
- *Learning Materials.* In approximately 90 percent of all schools in our sample, more than half of the students owned Math and Spanish textbooks, with no significant differences between FISE and non-FISE schools in this regard.

#### *Physical Sustainability*

- *Infrastructure.* The increase in enrollment in FISE schools corresponds with a similar increase in the number of classrooms during this period (from 4.6 to 6.0). FISE schools have better access to piped water, electricity and bathrooms than non-FISE schools.
- *Maintenance.* Parents of students in schools that have received FISE investments report greater improvements in the condition of their school (in both furniture and the status of infrastructure) over the past five years relative to parents in non-FISE schools.

#### *Community Participation*

- Communities with both FISE and non-FISE schools participated in school design and construction, but these rates were higher in communities with non-FISE schools.

#### **Utilization**

9.31 **Enrollment in FISE schools increased by 21 percent over 1993-1997, whereas enrollment in non-FISE slightly declined.** The differences between FISE and non-FISE schools over time (the difference in differences) is statistically significant. During this period, the percent of females enrolled in FISE schools fell slightly, while increasing in non-FISE schools from 50 percent to 52 percent. FISE staff believe that the increased enrollment in FISE schools is likely due to better facilities' ability to attract children that were previously not attending school or were attending other schools. Enrollment information is summarized in Table 9.8.

	1993	1997	Difference
<b># of total students enrolled</b>			
FISE	172.8	209.0	36.2*
Non-FISE	133.2	133.5	0.3
Difference	39.6	75.5	35.9*
<b>% of female students enrolled</b>			
FISE	55.3%	54.6%	-0.7%
Non-FISE	49.5%	51.6%	2.1%
Difference	5.8%	3.0%	2.8%

Source: FISE Facilities Survey

\* Difference statistically significant at the 5% level

9.32 **Student absenteeism rates were higher in non-FISE schools.** Using results from a special module of the FISE School Facilities Survey applied to third grade teachers, data revealed that 15 percent of FISE third grade students were absent at least one day the week preceding the FISE Facilities Survey interview, compared to 23 percent of non-FISE students. The number of school days scheduled during the previous month (17.6) was the same across school types.

## Operational Sustainability

### *Availability of Personnel*

9.33 **FISE schools are better staffed with teachers, administrators and support staff than their non-FISE counterparts, and have seen a significant increases in staffing since the FISE intervention above and beyond the increases observed in non-FISE schools.** The number of teachers in FISE schools increased by approximately one fifth between 1993 (before the intervention) and 1997, leading to a decline in student/teacher ratios. There was no increase in teaching staff for non-FISE schools although non-FISE schools experienced significant increases in overall staff. (see Table 9.9).

# of Teachers	1993	1997	Difference
FISE	7.26	8.74	1.48*
Non-FISE	5.52	5.67	0.15
Difference	1.74	3.07	1.33*
<b># of Administrators</b>			
FISE	0.89	1.53	0.64*
Non-FISE	0.42	0.69	0.27*
Difference	0.47*	0.84*	0.37
<b># of Other Staff</b>			
FISE	0.46	1.60	1.14*
Non-FISE	0.23	0.39	0.16*
Difference	0.23	1.21	0.98*
<b># of Total Staff</b>			
FISE	8.61	11.87	3.26*
Non-FISE	6.17	6.75	0.58*
Difference	2.44	5.12	2.68*

Source: FISE Facilities Survey

\* Difference statistically significant differences at the 10% level.

9.34 FISE staff attribute the greater increase in teachers in FISE schools to similar reasons that caused the greater staff increase in FISE health posts: coordination between FISE and MED to assure that MED adequately staffs schools that receive FISE interventions, and increased willingness of teachers to be placed in the better conditions that FISE schools provide. They suggest that if a school's physical conditions are extremely poor (i.e., no light, windows or ventilation), teachers will at times leave before the school year has ended, an outcome that was not measured in the 1998 FISE Facilities Survey but that should be included in future evaluations.

9.35 **Teacher profiles are relatively similar across school types.** Teachers in FISE and non-FISE schools are equally well educated (most teachers had 2-3 years of Técnico Medio/Normal level education); however, the non-FISE school teachers tend to be more experienced (with 12.2 years of teaching experience vs. 9.7 years for FISE teachers). Across both FISE and non-FISE schools, the majority of teachers are female and the average teacher age is 33.

#### *Access to Basic Materials*

9.36 **In approximately 90 percent of all schools in our sample, more than half of the students owned math and Spanish textbooks.** There are no discernible differences between FISE and non-FISE schools in this regard.

9.37 **Results vary regarding access to teaching materials.** Non-FISE schools were better equipped with maps and wall charts than the FISE schools, and FISE schools averaged 0.3 audiovisual materials compared with virtually no audiovisual materials in the non-FISE schools.

<b>TABLE 9.10: Basic Infrastructure in Education</b>	<b>FISE</b>	<b>Non-FISE</b>
Water comes to school through a pipeline*	68%	37%
Piped water is available during school hours	35%	25%
School has access to safe water* (1)	87%	64%
Average number of latrines	3.2	2.3
Average number of latrines per classroom	0.8	1.0
Percentage of latrines in regular or better condition	79%	65%
Electricity available during school hours*	56%	23%
Community has electricity*	81%	57%
Telephone in school	5%	7%
Rain drainage at school*	38%	7%
Source: FISE Facilities Survey		

\* Difference statistically significant at the 10% level.

(1) Safe water is defined as piped water inside or outside the facility, private or public well water, or water from a standpipe.

#### **Physical Sustainability**

##### *Infrastructure*

9.38 **FISE schools experienced larger increases in classroom numbers than their non-FISE counterparts.** The number of classrooms in FISE schools has increased from 4.6 to 6.0 over the 1993-1997 period, whereas this number increased from 3.5 to 4.0 for their national counterparts.

<b>TABLE 9.11: Do Parents Perceive Improvements in the Past Five Years? (percent)</b>	<b>FISE</b>	<b>Non-FISE</b>
The infrastructure and the physical condition of the school improved*	84	29
The infrastructure and the physical condition of the school worsened*	0	46
The availability and the condition of classroom furniture improved*	74	37
The availability and the condition of classroom furniture worsened*	8	27
The participation of parents in school activities increased (replied by parents)	58	52
The participation of parents in school activities increased (replied by principal informant)*	68	25
Source: FISE Facilities Survey		

\* Difference statistically significant at the 10% level.



**9.39 FISE schools have better access to basic infrastructure, but are also located in communities with better access to water and electricity.** Overall, 87 percent of FISE schools had access to safe water, compared to 64 percent of non-FISE schools.<sup>41</sup> Only 35 percent of the FISE schools that had water piped into the facility had regular service during school hours, compared to one fourth of non-FISE schools. FISE schools had more latrines than their non-FISE counterparts, and roughly the same number of students per latrine/toilet (92 enrolled students per latrine/toilet in FISE vs. 85 in non-FISE in morning session). FISE schools report having greater access to electricity; however, four fifths of the FISE schools were in communities with access to electricity, compared to only 57 percent of non-FISE schools. This information is summarized in Table 9.10.

### *Maintenance*

**9.40 Parents of children at FISE schools are more likely to think that their schools' infrastructure improved over time,** whereas almost half of the non-FISE respondents think that things have gotten worse in this area over the past five years. Similar results are found for status of the school's furniture, reflecting parents' appreciation of FISE investments. The results of the parents' answers are summarized in Table 9.11.

#### **Box 9.4: Recent FISE Education Initiatives**

Starting in 1998, FISE began providing gardening materials for primary schools receiving infrastructure interventions. The intervention is designed to allow the students to participate in and feel ownership over school gardens, and then to sell the produce to the local community to raise funds for the school which can be used to lower tuition fees or contribute to school maintenance.

In 2000, FISE will provide libraries for 380 schools. The schools decide which books to put in the library, and FISE will supply the books that the school selects.

FISE is now exploring the idea of building living quarters for teachers as an addition to its school infrastructure investments to reduce teacher absenteeism. As teachers often have to commute long distances to reach rural schools, these living areas would allow them to stay at the school during the week.

Source: Interviews with FISE management, March 2000

**9.41 The performance of preventative maintenance activities varies in FISE and non-FISE schools.** Specifically, we looked at two preventative maintenance activities in the primary schools in the sample: electrical systems and sanitary systems. 29 percent of FISE facilities performed preventive activities for their electrical systems compared to 42 percent of non-FISE schools. These figures are 76 percent and 50 percent, respectively, for sanitary systems, but the difference in neither area is statistically significant.

**9.42 Non-FISE schools report at least equal attention to general maintenance as FISE schools.** Of all the non-FISE schools surveyed, 48 percent had received repairs to their roofs, compared with 33 percent of FISE schools, a difference that may simply reflect the better infrastructure conditions of FISE schools. But of the non-FISE schools that do not perform repair activities, 48 percent say that the reason

<sup>41</sup> Safe water is defined as piped water inside or outside the facility, private or public well water, or water from a standpipe.

was a lack of funds. No FISE schools claim a similar lack of funds, implying that if they had need for repairs, they are most likely able to perform these activities.

### *Fees and Cost Recovery*

**9.43 FISE schools are more active in fundraising, but are similar to non-FISE schools in terms of their support from MED and their application of student fees.** 89 percent of all personnel salaries for FISE schools and 87 percent for non-FISE schools are provided by MED. 42 percent of FISE schools and 47 percent of non-FISE schools charge the students a tuition fee. FISE schools are more likely to undertake other fundraising activities such as holding raffles or running a snack bar.

#### **Box 9.5: Testimonies: School Interventions**

*"For me the school has been a great project, enormous. Before we had a little school made of planks and everything would get wet right down to the books . . . now we are doing well, but we need more support in maintaining the school."*

*"For me too the school is important, its better than the others. This community has the best school; the other communities don't have schools like we have here."*

Focus Group, Las Lagunetas

*"Things have gotten better because before we did not have a school and the poor children had to sit on the floor. We felt troubled, but with this project we are proud because the children are happy to come to class and play during recess. What we need here are electric lights and a well at the school, to give the community more pride."*

Focus Group, Yalagüina

Source: Qualitative Beneficiary Assessment

#### **Community Participation**

**9.44 Non-FISE parents were more likely to be involved in the design and construction of their school.** 72 percent of the FISE school parents and 76 percent of the non-FISE parents answer in the affirmative when asked if they knew who designed their child's school. Out of the parents who knew who was responsible, most of the FISE parents reported the FISE, MED, or the municipality as having the principal responsibility for the design of the project, while the non-FISE parents pointed to NGOs and the community.

**9.45 Sixty six percent of the FISE parents reported being consulted at the school design stage, compared with 90 percent of the non-FISE parents,** a difference that is statistically significant at the 10 percent level. Similarly, 59 percent of the FISE schools report that the community was active in the implementation phase vs. 73 percent of the non-FISE schools. FISE is the main institution heading construction of FISE schools (21 of 23), whereas no single institution emerges as a leader for the non-FISE schools.

### **Conclusion**

**9.46 FISE's investments in improving the quality and physical capacity of primary schools have been accompanied by improvements in overall staffing, student/teacher ratios and student enrollment.** Parents recognize these improvements, but report having been less involved in the design and implementation of the FISE project than parents in non-FISE schools that benefited from infrastructure improvements.

## **SECTION 3: WATER**

**9.47 Due to the small sample size (10 FISE projects), small project universe (18 FISE projects), and lack of comparator projects, the results of the FISE Facilities Survey for water systems are presented to**

highlight the characteristics of successful and less successful FISE water systems. The results are categorized according to the capacity of a water system to deliver water to the beneficiary community in a satisfactory manner. This is useful as there are aspects that are common to those projects providing water to the community in an abundant or sufficient manner, and likewise for those that have not provided sufficient water to their community. Of the ten FISE water systems included in the Facilities Survey, five provided sufficient or abundant water, and five did not.

9.48 One overriding difference between the successful and unsuccessful water projects is that the poverty levels in the communities with unsuccessful water projects (55 percent of residents are below the poverty line) are significantly higher than those in communities with successful water projects (37 percent). The differences in the poverty gap between the two is also significant: 27 percent in the former and nine percent in the latter.<sup>42</sup>

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<sup>42</sup> The full poverty line is measured as the level of total annual per capita consumption at which a person attains the minimum caloric requirements. This measure also includes needed expenditures on non-food items, such as housing, clothing, transportation, etc. The poverty gap defines the depth of poverty and is measured as a percent of the poverty line taking into account the share of the poor population in the national population.

### Box 9.6: Summary of FISE Water System Investments

The FISE Facilities Survey evaluated ten FISE water systems to assess utilization, operational sustainability, physical sustainability and community participation. Five of the systems in the survey supply water in a sufficient manner, and five in an insufficient manner. The majority of the successful systems are in low poverty areas, have subterranean water sources and use electrical pumps, and are operated by the National Water and Sanitation Institute (INAA). The majority of the unsuccessful systems are in higher poverty areas, are gravity-based systems with surface water sources, and are operated by the community.

#### *Utilization*

- Connection rates are high overall; half of the water systems are functioning at over 100 percent of their designed capacity, whereas one system in Jinotega is functioning at under 50 percent capacity.

#### *Operational Sustainability*

- *Productivity.* The successful systems supply water consistently (seven days a week); whereas the unsuccessful systems' water is rationed, supplying on average three days a week.
- *Water Treatment.* All successful system communities chlorinate their water regularly, compared to three fifths of the low availability communities. INAA supplies chlorine for the successful system (four of five), whereas communities with unsuccessful communities buy their own chlorine.

#### *Physical Sustainability*

- *Infrastructure.* Construction periods for the unsuccessful systems were over twice as long as for the successful systems; unsuccessful systems also report greater deterioration and reduced capacity.
- *Maintenance.* Maintenance activities are adequate overall, as the percentage of necessary activities carried out ranges from 67 percent for surface systems to 100 percent for subterranean systems.
- *Financing and Cost Recovery.* Connection costs are over four times as expensive and monthly fees three times higher in the high-supply communities. Nonetheless, payments are more timely in high-supply communities (67 percent compared to 59 percent in low-supply communities).

#### *Community Participation*

- Community participation is either low or non-existent in all aspects of water system projects: initiation, construction, operations and maintenance.

### Utilization

9.49 **Connection rates are generally high for the FISE water systems.** Rates run at around 90 percent of the systems' capacity, and half of the water systems are functioning at above 100 percent capacity.

9.50 **The systems in the low-supply municipalities had a low number of connections compared to the number of connections for which the system was designed,** although this was mainly due to the low connection rate in one project, while the high-supply communities reported a slightly higher number of connections than designed (Table 9.12).

<b>Table 9.12: FISE Water System Utilization</b>			
	<b>Sufficient Water</b>	<b>Insufficient Water</b>	<b>All Sites</b>
Number of connections designed	490	532	505
Number of actual connections	533	440	499
Number of household connections	519	439	490
Percentage of household connections with meters*	59.2%	0%	37.6%
Number of public, non-household outlets	0.33	0.80	0.50
Source: FISE Facilities Survey			

Sampling weights were used to calculate the means.

\* Statistically significant at the 5% level.

## **Operational Sustainability**

### *Availability of Personnel*

9.51 **Apart from one system in Managua, all systems employ less than six people.** All systems but one have at least one administrator and the only system without one does have a branch manager. While three of the five systems with low water supply employ plumbers, only one successful system employs a plumber.

### *Productivity*

9.52 **INAA operates the successful FISE water systems.** In four out of the five communities where water supply is not a problem, INAA is in charge of system operation and maintenance. All of the projects where water supply is a problem are managed by either the municipality or a local group.

9.53 **Monthly consumption in high availability systems is almost three times the amount in low-availability systems** (Table 9.13). According to FISE staff, this is likely due in part to the higher capacity of the successful water systems to provide larger quantities of water to their beneficiary communities. They also mentioned that it could be attributed to 'el Niño' weather patterns, where the resulting low rainfall diminished the capacity of surface systems during the period in which the evaluation took place.

9.54 **In municipalities where water availability is a problem, water from the system is rationed, and is available on average three days a week.** In the high availability communities, there is no water rationing. According to FISE officials, water rationing in the low availability communities is required because of water shortages in the summer, as well as operation and maintenance difficulties.

	<b>Sufficient Water</b>	<b>Insufficient Water</b>	<b>All Sites</b>
Subterranean source	77%	0%	49%
Electric pumps	89%	20%	64%
Total monthly production (cubic meters)	18,652	6,358	14,174
Total monthly consumption (cubic meters)	18,610	4,990	13,649

Source: FISE Facilities Survey

Sampling weights were used to calculate the means.

\* None of the differences are statistically significant.

### **Water Treatment**

9.55 **Water treatment varies but is more comprehensive for the successful systems.** The water systems engineers interviewed for each of the ten systems describe their water as free of bacteria. Two thirds of the low availability communities regularly chlorinate their water, while all of the communities with high availability perform the same task. Overall, FISE communities take water sample analyses with sufficient frequency; the sampling rates are acceptable in the low-availability communities and excellent in high availability communities.

9.56 **While six of the ten systems in the sample drain their water in an acceptable way, such as through a sewerage system connected to a public network or a septic tank, the rest drain the water into the ground or into a riverbed.** Broken down by water availability, 89 percent of the high-availability communities have proper drainage compared with only two fifths of the low-availability communities, a difference that is statistically significant at the 10 percent level.

	<b>Sufficient Water</b>	<b>Insufficient Water</b>	<b>All Sites</b>
Water chlorinated regularly (%)	100%	60%	85%
INAA provides the chlorine (%)	67%	0%	50%
Number of Bacteriological Tests in the last 6 months	9.2	4	7.3
Systems with proper drainage (%)	89%*	40%*	71%

Source: FISE Facilities Survey

Sampling weights were used to calculate the means.

\* Difference between sufficient and insufficient water systems significant at the 10% level.

## Physical Sustainability

### *Construction*

9.57 **The average duration for project execution was 7.2 months, with significant variability between successful and unsuccessful projects.** The successful projects were completed in just under five months, whereas the unsuccessful projects took 11 months to complete. According to FISE staff, several factors explain the longer construction periods for the unsuccessful water systems. These systems all used a surface source, and due to the nature of their design, construction is a longer process. However, the longer time periods could also result from insufficient initial research into the capacity of the water source – indeed some of the sampled systems had to be redesigned as they were not appropriate given their water source. Three of the projects, all in municipalities with insufficient water supply, report that the project caused problems for the community, including problems with system costs and design, and with the system remaining uncompleted.

9.58 **Successful projects generally use subterranean water sources, whereas unsuccessful projects all use surface water sources.** All of the systems in low-availability municipalities use surface (river, lake, stream, etc.) or sub-surface (filtered gallery) sources, while 77 percent of the systems in the high-availability municipalities use subterranean sources, such as wells.

9.59 **Only 20 percent of the systems in low-supply municipalities use electric pumps, compared to 89 percent of the systems in high-supply municipalities.** Since the high-supply municipalities are generally wealthier, it appears that they are able to attract the higher quality systems using more expensive components.

### *Maintenance*

9.60 **The percentage of necessary maintenance activities carried out ranges from 67 percent for surface systems to 100 percent for subterranean systems.** Overall, 73 percent of the necessary maintenance activities are carried out for distribution networks, and 86 percent of the systems perform these activities with sufficient frequency.

9.61 **Deterioration is greater in the unsuccessful systems.** According to the water systems engineers interviewed in the FISE Facilities Survey, in the past five years, two fifths of the projects in communities with low water supply report deterioration in the supply of water, the state of roads and streets, and in the number of trees, and one fifth report a decline in water quality and an increase in the presence of mosquitoes. In contrast, only 11 percent of the projects in high supply communities report a decline in water quality, and less than one fourth report that there are less trees in the community than five years ago; however, two out of five report a problem with streams and water puddles (Table 9.15). At the same time, two fifths of the systems in low supply communities report leaks vs. none of the systems in high supply communities.

<b>% who report deterioration in...:</b>	<b>Sufficient Water</b>	<b>Insufficient Water</b>	<b>All Sites</b>
Water quality	11	20	15
Water supply	0	40	15
State of the roads/streets	0	40	15
Streams and puddles	44	2	35
Presence of mosquitoes	0	20	7
Number of trees	23	40	29
Source: FISE Facilities Survey			

Sampling weights were used to calculate the means. The perceptions are of the principal informant, who is usually an administrator.

\*None of the differences are statistically significant.

**9.62 Successful systems have greater access to technical assistance and other inputs for sustainable operations and maintenance.** 88 percent of the projects in high availability communities have access to technical assistance, whereas only 60 percent of the latter group report this access. All low-supply communities complain of a lack of transportation; 80 percent cite a lack of tools, equipment, parts, and materials for operation and maintenance; 60 percent of them report lack of personnel as a problem and 40 percent report a lack of chlorine and cite technical problems with the system. These percentages are uniformly and significantly larger than those for the projects in the high-supply communities. According to FISE staff, the relative lack of technical support for the low availability systems is problematic, particularly since they are surface systems which require more maintenance than systems with subterranean sources.

**9.63 Communities with sufficient water supply have much greater access to technical expertise.** This is most likely due to the fact that four out of five of these systems are managed by INAA, and INAA has greater resources and technical capacity to operate water systems than most individual municipalities.

#### *Financing and Cost Recovery*

**9.64** The majority of the connections from communities with successful water systems were metered (59 percent), whereas none of the connections from the communities with insufficient water were metered.

**9.65 The cost of connecting each house to the water system is significantly higher in high water supply communities.** An average house connection cost US\$37.70 in municipalities with no water supply problems, but US\$8.45 in the municipalities with water supply problems. Although this is likely to be a reflection of differing system characteristics, it may also be a sign of lower quality connections. According to FISE staff, the higher connection costs for the high-availability systems are due to the need to cover the costs of the electric pumps that are used in the subterranean systems.

**9.66 The users in the high water supply communities pay approximately three times more than others in monthly fees.** A typical fee for the worse-off communities is US\$1.45 per month, while the fee for the better-off communities averages US\$4.40. FISE officials suggest that the lower fees collected in the low availability communities often leads to a lack of funds to maintain the system, in turn leading to greater system deterioration. Since these less successful systems are located in lower income communities, people are less able to pay the higher fees necessary for proper system maintenance. Information on connection costs and user fees are summarized below in Table 9.16.



	<b>Sufficient Water</b>	<b>Insufficient Water</b>	<b>All Sites</b>
Cost per household connection (US\$)*	37.70	8.45	27.11
Monthly user fees per household (US\$)	4.40	1.45	3.33
Percentage reporting the fees to be sufficient for O & M	55.7%	40%	50%
Source: FISE Facilities Survey			

Sampling weights were used to calculate the means.

\* Difference between high water supply and low water supply communities is significant at 10% level.

**9.67 The percentage of users who pay their fees on time is higher for the successful water systems.** On time payment rates are 59 percent for low-supply communities, compared with 67 percent in municipalities where there is no supply problem. About one tenth of the users in low-supply communities never pay their fees, compared with less than 0.5 percent in high-supply areas, a difference that is statistically significant. According to FISE staff, the higher payment rates in the sufficient supply communities is due to their higher incomes and to the more reliable service that they receive.

**9.68 Regardless of the user fees or compliance rates, the funds collected are not enough to operate and maintain the system.** Half of all the communities in our sample report that the funds are not enough, with not much difference across the two types of communities. FISE officials suggest that Managua, Estelí and León are the only self-sufficient water systems in Nicaragua. These systems (which were included in our sample) are operated by INAA, and the revenues from these systems are used to subsidize the other systems that INAA operates. Systems operated by the municipality receive no subsidy. Again, these subsidies favor the high-availability systems in our sample and help to explain the success of these systems.

### **Community Participation**

**9.69 User participation in the operation and maintenance of the water system is virtually non-existent.** Only one of the sampled projects (a high-supply system in rural Masaya) reports user participation in operations and maintenance activities.

**9.70 Only two of the ten communities were active in requesting a water project in their area.** Official application to FISE seems to come always from the municipality or INAA. INAA is also almost always involved in the formulation and technical design of the project, along with partners like the municipality and/or FISE, and occasionally contractors or NGOs. Land for project construction is provided mainly by the municipality, and occasionally by members of the community. When it comes to the provision of funds and equipment, FISE is virtually the sole provider. Project supervision is done mainly by INAA and the municipality, with some FISE involvement.

### **Conclusion**

**9.71 Wealthier communities appear to be able to attract higher quality water systems from FISE, and are able to maintain those systems more effectively.** All but one of the unsuccessful projects lie in areas with relative poverty higher than 33 percent, while all of the successful projects are in areas with poverty levels less than 33 percent. Four of the five successful projects are located in or within close vicinity to Managua.

9.72 **Successful systems are more expensive, with components such as subterranean sources and electrical pumps, have better access to technical assistance and are managed by INAA.** Unsuccessful systems are more likely to have surface water sources and gravity-based distribution systems. The successful systems have better access to technical assistance, which increases productivity and limits deterioration of the system. All but one of the successful systems are managed by INAA, whereas all of the unsuccessful systems were managed by the municipality.

#### SECTION 4. SEWERAGE SYSTEMS

9.73 **This section takes a similar case study approach to the analysis as the previous section on water, examining system characteristics in relation to standards and norms for the sector.** As with water systems, the sample size for sewerage systems is small (ten systems in a universe of 15 systems), and there are no non-FISE projects considered due to the lack of comparable projects.

9.74 **All ten of the sewerage systems in the sample are in urban areas; five in Managua that form part of a larger network and five in areas outside Managua.** The five systems in Managua are actually separate parts of one larger municipal sanitation system. Hence, for the purpose of the analysis, the sanitation systems projects are separated into two categories: (a) projects in Managua; and (b) projects outside Managua.<sup>43</sup> The reader should understand that since the five projects in Managua belong to one large system and are reported by two informants, the means for Managua should be taken only as indicative, not definitive. Averages are, whenever appropriate, weighted by the size of the project (i.e. by the number of household connections) in order to capture the effects of size in the absence of urban/rural sampling weights since all the systems are urban.<sup>44</sup>

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<sup>43</sup> In 1998, the poverty rate in Managua was 18.5 percent, compared to the national average of 47.9 percent.

<sup>44</sup> The weighting does not alter the overall results, as the results are similarly robust with and without weighting by project size.

### **Box 9.7: Summary of FISE Sewerage System Investments**

The FISE Facilities Survey assessed the utilization, operational sustainability, physical sustainability and community participation of ten FISE sewerage systems. All sewerage systems in the sample are in urban areas; five in Managua that form part of a larger network and five in areas outside Managua.

#### *Utilization*

- Eight of the ten projects in the sample were located in the Pacific Region, the geographic area with the lowest levels of poverty.
- Connection rates are universally low, with rates much higher in Managua (77 percent) than in the other areas (51 percent).

#### *Operational Sustainability*

- *Operations.* INAA operates and maintains all the systems, and provides most of the technical assistance.
- *Sewage Treatment.* The five systems in the Managua network lack water treatment facilities and dispose the raw sewage directly into Lake Managua.

#### *Physical Sustainability*

- *Maintenance.* The systems report few problems with maintenance, and maintenance activities are carried out regularly in all of the systems (although with less frequency in the Managua network). The majority of the systems report problems in rainy periods.
- *Community Impacts.* Principal informants (usually system administrators) report that the presence of the systems have led to improvements in road conditions, incidence of sickness, and the presence of insects, streams and puddles.
- *Fees and Cost Recovery.* Connection costs vary greatly between systems, with those in Managua averaging US\$30.00. Monthly fees averaged US\$2.00, and did not vary greatly. In most cases, the fees are included in the water bill, so those connected to the water system but not the sewerage system subsidize those connected to the sewerage system.

#### *Community Participation*

- Community participation in FISE sewerage projects is minimal; INAA is in charge of most aspects of initiating, constructing and operating the sewerage systems, with FISE funding the necessary land purchases for the projects and sometimes supervising project construction.

### **Utilization**

9.75 **Connection rates for the FISE sewerage systems are low, but differ greatly between the Managua systems and those outside Managua** (Table 9.17). In Managua connection rates are 77 percent of designed connections versus 51 percent outside of Managua. According to FISE officials, the lower connection rates outside of Managua could result from: i) households' lack of access to sewerage systems in the past, leading them to devise their own solution for sewerage disposal (i.e. septic tank), or to simply not see the need for proper sewerage disposal; and ii) incomes are not as high and work not as regular outside of Managua, so people are less inclined to pay the high costs of connection. More

generally, FISE officials attributed low connectivity to several factors: i) poor promotion, so potential users are not convinced of the benefits of using a sewerage system; and ii) the high connection costs, especially inside the household (i.e. purchasing a toilet). FISE suggests that, in order to increase connectivity, household connections need to be subsidized, as do initial monthly fees until the users begin to understand the value of the system (in terms of health and cleanliness). However, they suggested that connectivity often increases with time, as households that do not initially connect to the system may decide to do so at a later date.

	<b>Managua</b>	<b>Other Urban</b>	<b>All Sites</b>
Number of designed connections	420	629	524
Number of actual connections	325	326	325
Number of household connections	323	321	322
Connection rates (%)	77%	51%	61%

Source: FISE Facilities Survey

\* Differences are not statistically significant.

## **Operational Sustainability**

### ***Construction***

**9.76 Project completion took place in slightly under seven months.** When broken down by Managua or other urban areas, the average is 5.4 months for the systems in Managua and 8.2 for the ones in other urban areas. Overall, these project completion figures are well within reasonable time limits.

### ***Operations***

**9.77 INAA is the sole institution responsible for the operation and maintenance of the systems, and provides most of the technical assistance.** INAA was responsible for all training activities that took place for the sewerage systems. However, in some cases, training was unavailable and in others it was given well after the completion of the sewerage system. In Managua, the projects had technical directors, or other administrators to run the system. In other urban areas, the systems are run by either technical directors or branch managers.

### ***Sewage Treatment***

**9.78 The five projects in Managua lack proper disposal systems and dispose of their waste water directly into Lake Managua.** The five systems outside of Managua dispose of their sewage properly, after treating their residual water, mainly by oxidation.

## **Physical Sustainability**

### ***Maintenance***

**9.79 Systems basically function well in terms of operations and maintenance, but experience problems during periods of rain.** None of the systems in Managua report problems in operations and maintenance, while scattered problems (lack of equipment and personnel) are reported by some of the projects in other urban areas. Most of the ten systems in our sample report that in periods of rain, problems arise with these sanitation systems.

9.80 **Maintenance activities are performed, although not regularly.** In our sample, 78 percent of all maintenance activities are performed, but only 39 percent with the required frequency, and none of the maintenance activities of the Managua systems are carried out with the recommended frequency.

### *Community Impacts*

9.81 **Communities report improvements in certain aspects of living in the past five years as a result of their FISE sewerage systems, but problems remain.** 90 percent of the communities report that the incidence of sickness is down and there are less problems with streams and water puddles. 80 percent of the projects also report that the condition of the streets is better and that there are less insects. Only one community, located outside Managua, reports that incidence of disease, presence of insects, and disagreeable odors in the community have worsened. In terms of the principal problem still to be resolved, the informants in Managua again mention the presence of insects, the condition of the pipes and the utilization of the system, while the informants in other urban areas cite the condition of the streets and the presence of insects as the main problem in their communities.

### *Cost Recovery*

9.82 **Connection costs varied widely between systems.** Connection costs to the FISE sewerage systems in Managua was about US\$30.33. Two of the other projects (in Madriz and Carazo) report connection costs to be US\$4.60, and the connection costs in Esteli were reported as US\$27.60.

9.83 **Monthly fees for the FISE sanitation systems averaged US\$1.73, and did not vary greatly between systems.** In the majority of the homes (those in seven of ten projects), the monthly fee was included in the water bill, regardless of whether or not the house was connected to the system.

9.84 **As a result, community members paying for water but not connected to the sewerage system subsidize those connected to the sewerage system.** In one Managua system, there is no user fee. Poverty is cited as the principal reason for the low connection rates and monthly payment rates in the areas outside of Managua. Less than half of the systems report that the fees collected are sufficient for the operation and maintenance needs of the system.

	<b>Managua</b>	<b>Other Urban</b>	<b>All Sites</b>
Cost per household connection (US\$)	30.33	N.A	N.A
Monthly user fees per household (US\$)	1.72	1.76	1.73
Percentage reporting the fees to be sufficient for O & M (%)	40%	40%	40%

Source: FISE Facilities Survey

Standard errors in parentheses. Cells with N.A due to data limitations. \* differences not statistically significant.

9.85 **Seventy two percent of all households pay their monthly fees on time.** This goes up to a very high payment rate of 93 percent in areas outside of Managua vs. a 52 percent rate for the projects in Managua. The percentage of users who do not pay their fees at all is over 30 percent in Managua, mainly due to low rates in one project. All the users in other areas pay their fees, even if they may sometimes be late.

## **Community Participation**

9.86 **Community participation was minimal in FISE sewerage system projects.** Communities from the five sewerage projects in Managua participated in the project by initially requesting the projects, but no other community participation was noted. System design was by INAA, with some assistance from FISE. Municipalities, followed by INAA, provided the necessary land for the projects. FISE provided the funding for all the projects. Managua-based projects were supervised by INAA with the help of FISE, while the other projects were also supervised by INAA but helped also by the municipality, and sometimes by FISE and even the contractors.

## **Conclusion**

9.87 **The sewerage projects examined in this analysis revealed problems with connection rates, community participation, and waste treatment.** Connection rates were low, especially in the areas outside Managua where incomes were also lower. In Managua, the cost of connection was high - US\$30.00 – and monthly payment rates were very low (52 percent). Maintenance activities were adequate for the systems; however, the systems in Managua did not have proper waste water treatment. In general, the communities with FISE sewerage systems reported benefits of reduced incidence of disease, insects and bad odors resulting from the investment. However, community participation in all aspects of the FISE sewerage projects was minimal.

## 10. POLICY IMPLICATIONS OF RESULTS

10.1 The results of the Ex-Post Impact Evaluation point to FISE's achievements in improving the poor's access to and utilization of social investments, a change that has led to significant improvements in the health and education status of those benefiting from a variety of FISE social infrastructure investments. Efforts to improve FISE's impact should build on FISE's strengths, as established in this evaluation, and care should be taken to protect those elements of FISE investments that are working well.

10.2 This section provides recommendations for: (i) FISE's operations with respect to the work they manage directly; (ii) FISE's operations carried out in collaboration with other institutions, especially line ministries, local government and communities; (iii) FISE's monitoring and evaluation activities; and (iv) future social fund impact evaluations in Nicaragua and elsewhere.

### ACTIONS AND RECOMMENDATIONS FOR FISE OPERATIONS

10.3 This section draws from the results of a policy workshop held in Managua with FISE's management and principal multilateral and bilateral supporters in March 2000 to discuss the results of the FISE Ex-Post Impact Evaluation and implications for improving the impact of FISE operations.

10.4 As a result of the discussion of the impact evaluation findings held during the March 2000 workshop, FISE made the following **immediate decisions**:

- **Suspension of financing for sewerage projects.** Given the results regarding FISE sewerage projects' highly regressive poverty targeting and the lack of a measured impact on health outcomes, FISE has suspended financing of all future sewerage projects for at least two years, and is reducing its present support to four out of 11 projects currently receiving FISE financing.
- **Development of more integrated projects.** FISE has decided to finance components complementary to its infrastructure investments in the base facility (school, health post, etc.) such as access roads, residences for staff and additional training. This is aimed at increasing project sustainability by facilitating the provision of inputs beyond those directly under FISE's purview. However, results from this research suggest that FISE's investments in additional infrastructure and training will need to be coupled with the improved provision of key non-infrastructure inputs such as staffing and medicines from line ministries and/or other suppliers if sustained improvements in the supply of quality social sector services are to be achieved.
- **Review of FISE's monitoring and evaluation system.** FISE will be reviewing its monitoring and evaluation system to ensure that the various components are more complementary to one another and that certain key indicators are produced rapidly to support policymaking, while other longer-term indicators provide a foundation for an in-depth evaluation of FISE's achievements over time. This review will cover the three main FISE evaluation activities, an assessment of its Management Information System and a review of its key performance indicators.

10.5 Beyond the immediate actions resulting from the workshop, the results of the Ex-Post Impact Evaluation suggest a need to focus on the following actions in the short-term:

- **Emphasize the poorest of the poor.** Although extremely poor municipalities receive more FISE resources per capita than any other type of municipality and although FISE education and health investments are reasonably well-targeted to the poorest 40 percent of households, the targeting results conducted at the household level reveal that for those in extreme poverty (the poorest 17 percent of the population), FISE investments in all sub-project areas except latrines are either neutral or regressive. FISE needs to focus on how to reach the poorest of the poor, who have not been able to access their relative share of most types of FISE investments and who remain far behind the non poor in terms of their health, education and nutritional status. FISE's new "Red Social" pilot to provide conditional cash transfers will require a carefully thought out design as well as strong monitoring and evaluation to assess its ability to target the poorest of the poor and create incentives for investments in their human capital. FISE may also want to explore the expansion of promotion and outreach activities in very poor communities, particularly with respect to building an appreciation for health and education services among poor households.
- **Increase community participation at the sub-project level.** The results of the Qualitative Beneficiary Assessment report that communities feel that FISE could improve upon levels of community and local government involvement in FISE projects, particularly at the end of the project cycle during construction and once the project is completed with respect to maintenance. The microplanning process and the preventative maintenance funds that FISE introduced after the fieldwork for this evaluation was conducted may improve these shortcomings and should be considered in upcoming evaluations.
- **Review the balance between new social sector infrastructure investments and replacement, rehabilitation and expansion of existing infrastructure.** The results of the Poverty Assessment point to important gains among the poor in access to health and education – gains to which FISE has clearly contributed given its prominent role in providing these investments to the poor. FISE has moved strongly away from the provision of new investments, a move that may need to be re-examined given the results of the Poverty Assessment that suggest that physical distance to social services continues to impede access for the poor. This assessment and any resulting recommendations would, of course, need to be coordinated with a review of the capacity of line ministries or alternative providers to supply the required inputs to ensure the sustainability of any new infrastructure investments.
- **Focus on 'turnkey' infrastructure projects.** FISE should assess how to improve upon the number of sub-projects constructed with available, functioning basic services such as water and electricity. This is particularly important for health posts due to needed hygiene and medicine storage. As mentioned above, FISE should require the active participation of beneficiaries and local institutions to ensure that the infrastructure provided meets local expectations. FISE should also consider introducing an 'approval' process whereby the community and FISE would verify that the project has been fully completed.

### RECOMMENDATIONS FOR FISE'S WORK WITH OTHERS

10.6 **FISE's greatest challenge is to actively engage other institutions to improve the provision of quality interventions for the poor.** Meeting this challenge will require working with other often less dynamic institutions and forging creative alliances to achieve stronger household-level impacts. This evaluation shows that where FISE is most successful in achieving impacts, FISE investments are linked with parallel improvements in non-infrastructure investments, including staffing and overall participation. This synergy is clear with respect to the positive impact of FISE investments in primary schools, and



problematic with respect to FISE investments in rural health posts. The provision of infrastructure and training is necessary but is not alone sufficient to improve the human capital of the poor.

**10.7 As a first step in strengthening coordination between FISE and other institutions, a second workshop was held in October 2000 between FISE, the Ministry of Education (MoE), the Ministry of Health, INIFOM and ENACAL to discuss how to improve collaboration between FISE and line ministries to improve the impact of social sector investments.** The October 2000 workshop resulted in the discussion of concrete proposals on means for strengthening collaboration and the workshop participants agreed on creating a working group to follow up on the proposals with a concrete plan of action by the end of January 2001. This proposal will be reviewed for its potential to serve as basis for revised inter-institutional agreements between FISE and the line ministries regarding project approval. Below are several recommendations related to how FISE might move forward on building these coalitions, building on recommendations put forward in the October 2000 workshop.

- **Forge stronger links between communities, local governments, and local representatives of central government agencies, building upon Nicaragua's decentralization process.** FISE has already taken some potentially promising steps forward with the introduction of the microplanning process to engage municipal governments, communities and local representatives of line ministries in a locally led and oriented development process. In the municipalities, this process will require ongoing training and local capacity building tailored to the varying needs of different municipalities. These steps toward decentralization merit close monitoring and the microplanning process should be explicitly evaluated as part of the next Qualitative Beneficiary Assessment through a comparison of communities with and without the program.
- **Focus on balancing decentralization and strategic planning.** Line ministry officials issued a strong call for increased strategic planning to accompany decentralization, specifically through: improved inter-institutional coordination, the strengthened involvement of line ministries in the microplanning process, ongoing coordinated reviews of the balance between infrastructure requirements and sectoral norms and policies and complementary financing to improve both the strategic planning process itself and outcomes in beneficiary communities. On a practical technical level, line ministries also called for access to FISE's databases and coordination across sectors to establish a set of unique codes for all public sector establishments to allow for comparability across databases.
- **FISE and others should complement the supply of infrastructure with demand-side interventions by promoting direct contact with households to achieve desired household level outcomes and the participation of the poorest of the poor.** FISE's Red Social pilot should be monitored to assess the success of this demand side intervention. In addition, FISE, in coordination with the Ministry of Health or non-traditional health providers, should strengthen health outreach campaigns within communities receiving FISE investments.
- **Given the lack of a measured impact of FISE health investments on health outcomes that appear to be related to non-infrastructure deficiencies, MINSA should actively seek alternative service provision arrangements.** It should consider contracting out health post management to NGO's to provide needed staffing, medical supplies, medicines and outreach. The results of this pilot, if implemented, should be evaluated with respect to achieving desired health outcomes. If the desired outcomes are not achieved, MINSA should continue to seek alternative approaches and FISE should consider suspending the financing health post infrastructure projects.

- **Community contracting should be piloted in school infrastructure projects**, a request expressed by the Ministry of Education supported by their experience with community contracting for small infrastructure projects under the Ministry of Education's APRENDE project.
- **FISE along with INAA and/or other water service providers should explore ways to improve water projects in poorer areas.** The variance in quality in FISE water projects underscores the recognized need for a more effective model of water provision in poorer, more rural areas not presently served by INAA. FISE and INAA or an alternative service provider should take advantage of contacts with the World Bank and others that have worked on developing effective rural water supply models to pilot some alternative approaches in Nicaragua.
- **FISE should use its position as the public-sector institution that has championed impact evaluation, poverty assessments and poverty maps for Nicaragua as a departure point for actively engaging public, private and NGO actors in a results-oriented dialogue to develop an effective, monitorable, outcome-based poverty-reduction plan.** Present initiatives in the social sectors are fragmented across institutions, without strong and coherent leadership. Results of these uncoordinated interventions are predictably poor, as evidenced by the 1998 Poverty Assessment. FISE has championed and financed in-depth poverty assessments, impact evaluations and the development of a valuable poverty map. FISE should apply its technical expertise and marshal the empirical evidence it has produced to engage the Government of Nicaragua in a substantive dialogue on poverty reduction. Specifically, FISE should disseminate the results of this evaluation and of the evaluation being applied to the 'Red Social' pilot cash transfer project, as well as the 1998 LSMS and Poverty Map, so as to better inform Nicaragua's social protection strategy. These instruments can provide insight into the use of effective poverty targeting mechanisms and empirical evidence from various policy interventions that can help shape the dialogue, programs and goals being developed with Nicaragua's principal creditors as part of the debt relief plan for Highly Indebted Poor Countries.

### **RECOMMENDATIONS FOR FISE'S MONITORING AND EVALUATION SYSTEM**

10.8 The following recommendations are aimed at improving: (i) FISE's future impact evaluation efforts; and (ii) FISE's overall monitoring and evaluation system. The Ex-Post FISE Impact Evaluation provided information on the targeting, sustainability, access, utilization, and impact of FISE investments in rural health, primary education, latrine, sewerage, and water projects. This was the first impact evaluation conducted of FISE and one of the first conducted of any social fund. Although the evaluation was able to provide information on each of the areas contemplated for the study, the process was a first step that can be improved upon in subsequent applications. FISE plans to carry out the evaluation every four years in conjunction with the application of the LSMS survey.

#### **Improving FISE's Impact Evaluation Efforts**

- **Maintain the Link Between the LSMS and the FISE Evaluation.** Conducting the FISE Evaluation in conjunction with the LSMS using the LSMS questionnaire as the basis for the FISE Household Survey proved very useful in estimating the poverty targeting and impact of FISE projects. This approach should be maintained, as FISE is planning to conduct impact evaluations every four years.
- **Maintain the link between the Qualitative Beneficiary Assessment and the FISE Evaluation.** When the impact evaluation is applied every four years, the beneficiary assessment should be applied in a sub-sample of communities selected for the impact evaluation.

- **Reduce the size of the FISE Household Survey questionnaire.** Many variables collected in the LSMS survey were not used for estimating targeting and impact for the FISE Ex-Post Impact Evaluation. Now that the targeting and propensity score matching estimates have been conducted information is available on the types of variables needed to conduct these analyses and the version of the LSMS questionnaire applied for the FISE Evaluation could be reduced without compromising comparability with the LSMS. This would reduce the response burden on households and allow for some FISE specific questions to be introduced for the FISE Evaluation
- **Consider using the FISE Impact Evaluation to compare alternative interventions.** Future applications of the impact evaluation should consider exploring a particular intervention or operational mode more intensively. For example, instead of having the projects grouped only by type of sub-project, the evaluation could contain a representative sample of beneficiaries of projects developed using the microplanning process compared to a representative sample not using the microplanning process. These types of stratifications could also be considered for the Qualitative Beneficiary Assessment.
- **Increase the sample size for the FISE Facilities Survey and integrate project-level baseline data collection into FISE's project appraisal system and Management Information System.** The sample size for the FISE Facilities Survey should be increased to provide robustness to the estimates. A sampling specialist should be contracted to conduct power calculations for estimating required sample sizes to generate representative samples by sub-project. Project-level baseline indicators could also be collected as part of FISE's ex-ante appraisal system and integrated into FISE's management information system.
- **Build Baseline Data into the FISE Impact Evaluation.** Baseline household data should be built in to the FISE impact evaluation system. Several options should be explored for carrying this out including, (i) using 'pipeline' projects (those that have been appraised but not implemented) and their corresponding households as comparison groups in time 0 which automatically provides baseline data for a follow-up on the same projects and households in time 1 after the FISE intervention has taken place; (ii) constructing a 'match' between households that will receive FISE investments and non-FISE households using the propensity score matching techniques and the LSMS data.
- **Review the list of indicators used in the FISE Impact Evaluation and the list of key performance indicators** as part of the review of FISE's overall monitoring and evaluation system. For example, future impact indicators could include achievement test scores now that a national testing system is being developed for Nicaragua and measure of the degree of correspondence between community priorities for investment as measured during the ex-ante microplanning process and the type of investment provided by FISE.
- **Consider the use of randomization to assign future FISE investments.** Randomization can be used to transparently assign projects to equally-eligible communities and to facilitate strong impact evaluations since the random allocation process ensures comparability between the treatment and control groups, given sufficient sample sizes (Newman, Rawlings and Gertler 1994). This has been used effectively even for the evaluation of social funds, despite their demand-driven nature, by randomizing on active promotion as was done in the Bolivia social fund (Pradhan, Rawlings and Ridder 1998).
- **Collect information on the actual project selection process.** Future impact evaluation efforts would be strengthened by including additional information on the selection process explaining why certain

communities received (or did not receive) certain FISE projects. This could substantially strengthen the impact evaluation estimates (Moffitt 1991).

### **Improving FISE's Overall Monitoring and Evaluation System**

- **Integrate and Streamline FISE's Existing Monitoring and Evaluation System.** FISE's plans to review its monitoring and evaluation system should be supported. Much of the data that FISE maintains in its management information system suffers from difficulties in comparability across systems, accessibility and ease of interpretation. FISE's various evaluation activities should also be reviewed to ensure their complementarity to one another and their ability to produce necessary information in a timely, reliable manner. The impact evaluation results which are infrequent, longer term, and statistically representative need to be balanced with more frequent results from the annual beneficiary assessments, the vertical projects monitoring system and the management information system to form the basis of a complementary and dynamic monitoring and evaluation system.
- **Evaluate Pilots within FISE.** The pilots being introduced by FISE such as the conditional cash transfer program should be accompanied by rigorous evaluations and designed to facilitate their evaluation, for example, by introducing the investments randomly to generate an experimental design. The present evaluation of the cash transfer program is a good example of the type of evaluation that should be applied to innovative pilot programs.
- **Establish a technical unit in FISE to inform strategic planning and manage monitoring and evaluation activities.** FISE should consider establishing a small, agile technical unit within FISE to review and guide its targeting strategies (both geographical and individual), project design, monitoring and evaluation, including the evaluation of a new initiative such as the "Red Social" pilot. This unit should be staffed with technical specialists (economists, statisticians, and/or evaluation specialists) who would liaise with others in FISE to provide strategic planning for the institution. This unit could also be nurtured to provide leadership in the evaluation field in Nicaragua and form part of the technical team advising the Government of Nicaragua on setting and measuring benchmarks for poverty reduction.

### **RECOMMENDATIONS FOR FUTURE MONITORING AND EVALUATION WORK**

10.9 We conclude this section by reflecting on: (i) how poverty monitoring and evaluation work can be improved in Nicaragua; and (ii) lessons from the Nicaraguan experience for social fund impact evaluation work outside of Nicaragua.

#### **Improving Nicaragua's Poverty Monitoring Capacity**

- **Use GIS technologies and strengthen data management and analysis skills to improve poverty monitoring and evaluation.** The nascent efforts to implement Geographic Information Systems (GIS) in the National Institute for Statistics and Census (INEC) and other agencies should be supported and combined with efforts to integrate data sources key to poverty monitoring, including data on service provision from line ministries (such as the location of schools and health centers), data from the LSMS and data from the Demographic and Health Survey.
- **Establish a unique set of codes for social sector establishments – especially for schools, health posts, health centers and hospitals.** Nicaragua does not have the benefit of a unique set of numerical identifiers for its social sector infrastructure to aid in coordinating inputs or tracking

outcomes. This implies that databases cannot be shared – for example, it is impossible to obtain the Ministry of Education’s school enrollment data and cross it with FISE’s database on which schools have received infrastructure projects. This effort should be coordinated with the National Statistical Institute and required in future projects.

### **Lessons from the Nicaraguan Experience for International Social Fund Impact Evaluations**

- **Draw out lessons and ‘best practice’ tools from the various social fund impact evaluations being carried out worldwide.** The evaluation work carried out in Nicaragua and similar social fund evaluations applied in Armenia, Bolivia, Honduras, Peru, and Zambia as part of the World Bank’s Social Funds 2000 initiative are now yielding robust results on the targeting, impact and sustainability of social funds. These evaluations have looked at social fund infrastructure investments in education, health, water and sanitation and the results are being reviewed and disseminated. The World Bank should spearhead an effort to provide ‘best practice’ tools coming out of these studies and make these available to clients for similar work in the future through regional training and by posting them on a website.
- **Adapt social fund evaluation work to evolving social fund strategies.** Assessing the human development impact of investments in social infrastructure projects may not be an appropriate focus for impact evaluations in a few years if social fund menus and approaches change as dramatically as they have in the past few years and move away from this core function. Social funds are rapidly-evolving institutions that present a challenge to those working on their evaluation to make sure that the research remains as dynamic as the institutions themselves.
- **Apply impact evaluations strategically.** Impact evaluations that assess causality through the establishment of counterfactuals need not be applied to all social funds. Whereas strong monitoring systems should be established in all social funds, the cost, complexity and time required to apply impact evaluations should be reserved for cases where new insights can be generated and the policy impact of the results is likely to be substantial.
- **Maintain high levels of client consultation and donor coordination** with respect to monitoring and evaluation activities in order to not overburden clients and to ensure the relevance and complementarity of the various monitoring and evaluation efforts.

10.10 Other general recommendations regarding the impact evaluation of social funds are being developed as part of the World Bank’s Social Funds 2000 research project.

## ANNEX A: IMPACT EVALUATION METHODOLOGY USED FOR THE FISE EVALUATION

1. **The FISE Impact Evaluation seeks to answer the question “had the FISE not existed, what would have been the conditions of the facilities and beneficiaries in the FISE communities?”.** This question, known as the ‘counterfactual’, lies at the heart of the impact evaluation. The FISE evaluation approach assumes that the counterfactual to not having a social fund would be the level of social service provision in non-FISE areas. The evaluation therefore does not compare FISE to another type of program, but instead seeks to answer the hypothetical question posed by the counterfactual. As is the standard approach in many impact evaluations, the FISE evaluation addressed this question by identifying a comparison group that did not benefit from a FISE intervention and contrasting the results observed in the comparison group to those from the treatment group of FISE beneficiaries.
2. Two factors circumscribed the choice of evaluation designs. First, the demand-driven process of community requests for FISE projects limited the ability to randomly assign investments and therefore use an experimental evaluation design.<sup>45</sup> Second, the lack of baseline data and the decision to obtain relatively rapid results on the impact of existing FISE limited our ability to assess changes over time, except from household recall and administrative records kept by schools and health centers.
3. Because of these constraints, **the FISE Ex-Post Impact Evaluation does not have the benefit of baseline data or of randomization.** These shortcomings have been addressed in four ways. First, the impact assessments use econometric techniques to control for the differences between FISE participating and non-participating households and projects. Second, in order to partially compensate for the lack of baseline data, the household and project questionnaires rely on recall questions and pre-intervention administrative data. Third, to lend robustness to the household impact estimates, the FISE evaluation uses two different methodologies to construct the “counterfactual” state upon which the evaluation depends. Fourth, we use both household survey-based impact estimates as well as project survey-based estimates and qualitative community-based assessments to examine the impact of FISE investments.

### MATCHED COMPARISON EVALUATION DESIGN

4. **The FISE Impact Evaluation uses a ‘matched comparison’ evaluation design to assess the impact of FISE.** This type of design uses a comparison group “judged to be comparable to the participant group in important dimensions, but does not receive program services” to assess program impact (Grossman 1994).
5. **Within the ‘matched comparison’ framework, the FISE Evaluation applies two types of ‘matching’ between the FISE treatment group and the non-FISE comparison group to lend robustness to the impact estimates.** The first type of matching and resulting counterfactual will be referred to as the “FISE Comparison Group” and the second as the “Propensity Comparison Group”.
6. In order to determine the impact of FISE on a household level, the FISE evaluation made use of two control groups to compare to the treatment group that benefited from the FISE intervention. The first, the ‘FISE Comparison Group’, was constructed using a sample of households corresponding to the closest non-FISE facilities similar to the FISE schools and health posts from which the treatment group household sample was taken. The second, the ‘Propensity Comparison Group’, was taken from

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<sup>45</sup> It is possible, however, to randomize on the *offer* of an intervention as was done in the Bolivian social fund.

households that matched the FISE treatment households using a propensity score matching technique. The propensity score weights the probability that an individual receives a FISE intervention based on pre-intervention characteristics (including ability of a community to prepare project proposals, FISE investment preferences using poverty map data, and pre-program outcome indicators where available) and then compares the treatment group to individuals that have similar propensity scores, but did not receive a FISE investment.

### **FISE Comparison Group Methodology**

7. **The FISE Comparison Group evaluation methodology is a matching method based on geographical proximity and similarities between FISE and non-FISE facilities.** This method relies on a comparison group sample identified at the beginning of the FISE Impact Evaluation using two stages, the selection of facilities and the selection of households.

8. At the *facilities level*, the matched comparison entailed comparing primary schools and health posts that have benefited from FISE investments with similar schools and health posts from the closest, separate communities that had not benefited from a similar FISE investment. Specifically, the match was based on characteristics of facilities (size and type) and geographic proximity.<sup>46</sup>

9. At the *household level*, the evaluation sampled households in the area of influence of FISE and non-FISE projects, identifying which households are direct beneficiaries (ie. users of the investment) and which households are not beneficiaries (ie. not users and only part of the overall group of potential beneficiaries) of the FISE investments and comparison group investments during the course of the household enumeration process. This allowed for an assessment of targeting and impact at both the household (direct beneficiary) level and community (potential beneficiary) level. This type of matching technique was applied to assess the impact of FISE health post and primary education projects on beneficiary households.<sup>47</sup>

### **Propensity Score Comparison Group Methodology**

10. **The second type of matched comparison methodology applied to assess household impact in the FISE Evaluation is a statistical approach, *propensity score matching*, that matches treatment and comparison groups based on observed characteristics using statistical matching techniques** (Rosenbaum and Rubin, 1983; Jalan and Ravallion, 1998). The propensity score matching process is described in Box 7.1. In essence, this technique examines the determinants of being a FISE beneficiary and establishes a ‘score’ that predicts the propensity of benefiting from a FISE investment. Using this score, the FISE treatment group is then matched with a non-FISE comparison group using the predicted value of being a FISE beneficiary, given the observed characteristics from the household survey data.<sup>48</sup>

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<sup>46</sup> Characteristics used for the matching of FISE and non-FISE facilities include: location (urban or rural) and poverty category of the municipality. Number of classrooms was also used to match schools, and ‘type’ of health post according to the Ministry of Health’s norms was used to match health posts. Using this criteria, FISE facilities were matched to the geographically nearest non-FISE facilities that did not overlap in area of influence.

<sup>47</sup> Weights were constructed to correct for choice-based sampling.

<sup>48</sup> To establish which households in the LSMS survey could be considered for selection as part of the comparison group, the FISE Evaluation used administrative data on FISE project coverage to identify households in the LSMS that have not benefited from a FISE investment. This was done by combining data on FISE projects’

Finally, the mean from the FISE treatment group is compared with the mean from the non-FISE comparison group. In order to control for regionally specific unobservable characteristics, and taking advantage of the large size of the LSMS survey that is representative of households in each of Nicaragua's seven regions, the matching was restricted to households within each of the seven regions.

11. **This technique was made possible by combining the FISE Household Survey data with the LSMS household survey data.** Specifically, the match was made possible by having (i) a large pool of non-FISE households available from which to select the match, as provided by the LSMS, and (ii) the same data available from both the FISE and LSMS household samples, as generated by having applied the same questionnaire in the FISE and LSMS surveys. The propensity score matching methodology was applied to assess FISE projects' impact on households receiving FISE interventions in primary schools, health posts, latrines, and water and sanitation systems.

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geographical location (and corresponding area of service coverage such as the health district) with census segments maps identifying the location of individual households. Using the combined data, households located in census segments in FISE projects' area of influence were eliminated from the matching process.



### **Box A1: Steps in Propensity Score Matching**

The aim of all matching methods is to find the closest comparison group from a sample of non-participants to the sample of program participants. In propensity score matching, "closest" is measured in terms of observable characteristics. If there are only one or two such characteristics then matching should be easy. But typically there are many potential characteristics. The main steps in matching based on propensity scores are as follows:

**Step 1:** You need a representative sample survey of eligible non-participants as well as one for the participants. The larger the sample of eligible non-participants the better, to facilitate good matching. If the two samples come from different surveys, then they should be highly comparable surveys (same questionnaire, same interviewers or interviewer training, same survey period and so on).

**Step 2:** Pool the two samples and estimate a logit model of program participation as a function of all the variables in the data that are likely to determine participation.

**Step 3:** Create the predicted values of the probability of participation from the logit regression; these are called the "propensity scores". You will have a propensity score for every sampled participant and non-participant.

**Step 4:** Some of the non-participant sample may have to be excluded at the outset because they have a propensity score which is outside the range (typically too low) found for the treatment sample. The range of propensity scores estimated for the treatment group should correspond closely to that for the retained sub-sample of non-participants. You may also want to restrict potential matches in other ways, depending on the setting. For example, you may want to only allow matches within the same geographic area to help assure that the matches come from the same economic environment.

**Step 5:** For each individual in the treatment sample, you now want to find the observation in the non-participant sample that has the closest propensity score, as measured by the absolute difference in scores. This is called the "nearest neighbor". You can find the five (say) nearest neighbors.

**Step 6:** Calculate the mean value of the outcome indicator (or each of the indicators if there is more than one) for the five nearest neighbors. The difference between that mean and the actual value for the treated observation is the estimate of the gain due to the program for that observation.

**Step 7:** Calculate the mean of these individual gains to obtain the average overall gain. This can be stratified by some variable of interest such as incomes in the non-participant sample.

Adapted from "Evaluating the Poverty Impact of Projects: A Handbook for Practitioners" Baker, J. L., World Bank, 1999.

## ANNEX B: SAMPLING AND DATA

1. All data were collected in mid-1998 before Hurricane Mitch hit Nicaragua in October 1998 and therefore present a pre-Mitch assessment of FISE's impact. The evaluation and sampling design, development of the household and facilities surveys and the coordination between the survey data collection and beneficiary assessment entailed extensive collaboration between staff from the Government of Nicaragua, the World Bank and communities selected for the pilot testing of these data collection instruments. These efforts were led by the FISE evaluation team consisting of World Bank, FISE and INEC staff and consultants.

### SAMPLE

2. The sample for the FISE Impact Evaluation was generated in two stages: first, for the facilities sample, then for the household sample. The sample is representative of households benefiting from FISE investments and households in the comparison group, by type of subproject. The sample is not representative of facilities benefiting from FISE investments, nor is the household sample representative at any level beyond type of subproject.

#### BOX B.1: Components of the LSMS and FISE Household Survey

##### Household Questionnaire Modules

- Household Characteristics
- Household Composition
- Health
- Education
- Economic Activity
- Fertility and Woman's Health
- Time Use
- Independent Economic Activities
- Expenses and other Household Investments
- Agricultural Activities
- Savings, Loans and Credit

##### Additional data collected in a separate module

- Anthropometrics (height and weight)
- Price questionnaire

Source: 1998 FISE and LSMS Household Questionnaire

PROJECT TYPE	TREATMENT GROUP (FISE)	COMPARISON GROUP (NON-FISE)	TOTAL
Primary Schools	24	24	48
Health Posts	20	20	40
Water and Sewerage	20	0	20
Latrines	23	0	23
Total	87	44	131

Source: FISE Facilities Survey

3. The FISE facilities sample was generated first by selecting a random sample of FISE projects completed between January 1994 and June 1997, stratified by the five types of project considered in the evaluation (see Table 4.1). FISE primary

schools and health posts were then matched to similar, nearby non-FISE schools and health posts following procedures described in Section 7 on evaluation methodology.

4. For the FISE household sample, the FISE evaluation team took advantage of the application of the 1998 LSMS in May-September 1998 to jointly implement a FISE Household Survey to oversample households in the area of influence of FISE and comparison group projects.<sup>49</sup> The households selected for

<sup>49</sup> Areas of influence were set in consultation with FISE engineers and staff from line ministries. The area of influence of water and sewerage systems as defined as the areas covering households able to physically connect to the network due to their geographical proximity to the service. For rural primary schools, the area of influence was defined as a three kilometer radius around the school. For urban primary schools the area of

the FISE Household Survey are a random sample of households in the area of influence of the FISE and non-FISE facilities selected for the FISE evaluation during the first stage of sampling. 10 households were selected corresponding to each facility in the FISE Facilities Survey. As part of the household enumeration process carried out within the area of influence of the sampled FISE and non-FISE facilities, households directly benefiting from the FISE or non-FISE facility (i.e. those using the facility) were identified and subsequently oversampled to ensure a representative number of direct beneficiaries. For the analysis, sampling weights were applied reflecting the sampling procedures.

5. **The FISE Impact Evaluation also uses the data produced by the LSMS** which is based on a nation-wide sample of households in rural and urban areas throughout Nicaragua. Overall, 4,040 households were included in the LSMS household survey and 1,312 households in the FISE Evaluation household survey. (see Table 4.2).

**TABLE B.2: Sample Sizes of LSMS and FISE Household Surveys**

		Direct Beneficiary		Total
		Yes	No	
<b>LSMS</b>				4040
<b>FISE</b>				1312
<i>Education</i>	With FISE	161	79	240
	Non FISE	142	99	241
<i>Health</i>	With FISE	165	34	199
	Non FISE	164	35	199
<i>Water</i>	With FISE	95	0	95
<i>Sewerage</i>	With FISE	74	30	104
<i>Latrine</i>	With FISE	234	0	234

Source: FISE household Survey

6. **The sample for the qualitative study took advantage of the Qualitative Beneficiary Assessment** which was applied to measure the social impact of FISE projects as perceived by government officials, facility personnel and direct FISE beneficiaries. This methodology was developed in 1996 by the Research Triangle Institute with funding from KfW, the German bilateral aid agency. In 1998, this annual evaluation was applied with funding from the Inter-American Development Bank by the Instituto de Desarrollo Empresarial Asociativo (IDEAS) to 22 municipalities that had benefited from FISE investments, and investigated a total of 43 FISE projects completed in the period 1991 to 1996 in those communities.

7. The municipalities in the beneficiary assessment sample were selected as a subsample of the communities selected for the FISE Ex-Post Impact Evaluation to ensure comparability with the survey data being collected for the impact evaluation.

## DATA

8. **The FISE Ex-Post Impact Evaluation uses four main sources of data** to consider the impact of FISE investments in primary schools, health posts, latrines, water and sewerage systems completed between January 1994 and June 1997:

9. First, *facilities surveys* were applied in the schools, health posts, water and sewerage systems that received FISE funding.<sup>50</sup> Second, *household surveys* were applied in the corresponding households that benefit from the investments. Similar data were also collected from comparison institutions and households. Third, the FISE Ex-Post Impact Evaluation applied a *qualitative evaluation* to a sub-sample

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influence was defined as a 500 meter radius around the school. For urban and rural health posts the area of influence established by the Ministry of Health for its health service network was used, within a six kilometer radius of the health post. The areas of influence for health posts were verified during the household enumeration process prior to fielding the FISE Household Survey.

<sup>50</sup> Latrine investments were considered only through the household survey.

of communities that had received a FISE investment and been selected for the facilities and household survey.

10. Finally, the FISE Ex-Post Impact Evaluation used *administrative data* from FISE to review the scope of FISE investments and for municipal level targeting. In the absence of baseline data, administrative data from schools and health posts were used to measure changes in enrollment or utilization as a result of the FISE interventions.

### Household Data

11. **Household data were produced by the 1998 LSMS and FISE Household Survey.** The same questionnaire that was used for the 1998 LSMS survey was also applied in the FISE Household Survey, which interviewed households either living in the area of influence of facilities that received a FISE investment or in the influence of a comparison group project, in order to determine FISE's poverty targeting and impact on individual beneficiaries. The use of the same questionnaire, applied at the same time by teams that had received the same training, allowed for comparability between the FISE household survey data and the LSMS national household survey data.

12. **The household survey captured basic socioeconomic data and collected information to establish a consumption-based poverty measure<sup>51</sup>** (Box 4.1). The household survey utilizes a questionnaire with eleven sections that focus either on individual household members or on the household itself. Sections on individual household members include: health, education, employment, fertility and time use. Sections on the household itself include: household conditions, farming activities, independent business activities, and expenses and credit. The household sections of the survey were directed either to the head of the household, or to the individual best informed regarding the survey questions.

13. The survey was accompanied by an *anthropometric module* to record the height and weight of all household members (except for disabled or elderly) and the conditions of pregnant women living in the sampled household. Also, a *price questionnaire* was utilized to construct a *consumption aggregate* in order to provide a consumption-based measure of poverty. The consumption aggregate formulated by the questionnaire served to classify households as extremely poor, poor and not poor relative to poverty lines, and also to separate households into consumption-based poverty quintiles.

### Facilities Data

14. **Facilities data were provided by the FISE Facilities Survey of water and sewerage systems, health posts and primary schools.** The FISE Facilities Survey consists of facility-specific questionnaires developed to evaluate the impact of FISE interventions completed between January 1994 and June 1997.<sup>52</sup> These questionnaires, designed by World Bank, INEC and FISE staff, were administered to key informants associated with the facility: the facility director, a second staff member, and a community leader knowledgeable about the facility. Each questionnaire collected data regarding the current physical condition of the facilities, the level of utilization and community participation, service provision, staffing and employment generation, maintenance, and any problems pertaining to the facility. Overall, 108 facility questionnaires were completed.

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<sup>51</sup> See Chapter 6 on targeting for more information on the consumption-based poverty measure used in the FISE Evaluation.

<sup>52</sup> Latrines were not included in the FISE Facilities Survey. As latrines benefit individual households, the assessment of FISE latrine interventions was conducted through the FISE Household Survey.

15. We use a case study approach to examine the results of the FISE Facilities Survey data jointly with the results of the Qualitative Beneficiary Assessment (discussed below). The use of both quantitative and qualitative data from FISE subprojects and their corresponding communities provides robustness to the analysis through the triangulation of methodological approaches and data.

### Qualitative Data

16. Qualitative data from the beneficiary assessment is used to evaluate the social impact of FISE projects as perceived by government officials, facility personnel and direct FISE beneficiaries, using key informant interviews and focus groups. Overall, 246 key informant interviews were conducted with local officials, representatives from relevant line ministries, facility employees, members of community health and education committees, beneficiaries and project contractors. A total of 24 focus groups (with 438 participants) were conducted in relation to FISE health, education, water and sewerage investments.

Focus groups were held with community members, including service users and employees of the schools and health centers that had received a FISE investment. Of the 24 focus groups, ten evaluated FISE primary schools, nine evaluated health posts, two evaluated sewerage projects, two evaluated latrine projects, and one evaluated a combination of projects. The focus groups assessed community satisfaction with the FISE project and the community role in the processes of project development and maintenance.

#### **BOX B.2: Areas Considered in the Qualitative Beneficiary Assessment**

- Priority and satisfaction with the FISE infrastructure;
- Community participation in the design and management of the FISE project;
- Psychological well-being resulting from FISE projects;
- Employment generated from FISE projects;
- Participation of government entities in the design and management of the project;
- New community priorities for social infrastructure development; and community perception of FISE.

Source: Qualitative Beneficiary Assessment, IDEAS, 1998

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